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COLLIER'S NEW ENCYCLOPEDIA

A LOOSE-LEAF AND SELF-REVISING REFERENCE WORK

IN TEN VOLUMES WITH ILLUSTRATIONS AND NINETEEN MAPS

VOLUME



The Capitol, looking toward the East Front. It is on the central portion of this front that inauguration ceremonies take place. The corner stone of the Capitol was laid by George Washington in 1793. The North Wing was completed in 1800 and became the seat of government immediately. The central part was begun in 1818, under the direction of the famous American architect, Charles Bulfinch. The extensions were begun in 1851 and completed in 1859.

P. F. COLLIER & SON COMPANY
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VOLUME ONE

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Introduction

THE word encyclopædia was first used by the Greeks, not for a book, but for a system of instruction in the whole circle of learning. Knowledge in their time was still so limited in extent that it could be thought of as taught by one man and covered in a single educational curriculum. The oldest book which has come down to us attempting to comprise all information is the "Natural History" of Pliny the elder, who died in A. D. 79. Pliny himself was not a scientist, but a Roman lawyer, soldier, and administrator, with a passion for study; and he lost his life in an attempt to observe at close quarters the eruption of Vesuvius which destroyed Pompeii and Herculaneum. His work is a compilation from some two thousand books, and he himself says that he recorded twenty thousand facts. His chief successors were Martianus Capella, an African, who wrote in the 5th century, also in Latin, a compendium long used as an educational textbook, and Isidore of Seville (600-630), who was regarded for centuries as a high authority.

The most noted of mediæval compilers of universal learning was Vincent of Beauvais, who used the word "speculum" or mirror for his account of the world and man. He wrote in the 13th century and his method was chiefly that of quotation, which, though it reduces his credit as an original writer, led to his preserving large numbers of authors who would otherwise have been lost, and at the same time to his giving an impetus to the study of classical authors. In his "Mirror of Nature" he takes up things in the supposed order of their creation, not a very convenient system for consultation, but his subdivisions are frequently alphabetical. He is, of course, uncritical and far from scientific in the modern sense, but he was extraordinarily learned and industrious.

Vincent had many successors in the Middle Ages, the list closing with the work of John Heinrich Alsted in 1630, for which he used the name "Encyclopædia." Hereafter, such works generally adopt the alphabetical order instead of an attempt at a system of knowledge, and modern languages take the place of Latin.

The first book of the new type in English was John Harris' "Lexicon Technicum, or an Universal English Dictionary of Arts and Sciences," 1704. As its title suggests, the distinction between a dictionary and an encyclopædia was not yet clearly grasped, this work being an attempt both to define words and to explain subjects. The same confusion is seen in Ephraim Chambers' "Cyclopædia: or an Universal Dictionary of Arts and Sciences, Containing an Explication of the Terms and Account of Things Signified Thereby in the Several Arts, Liberal and Mechanical, and the Several Sciences, Human and Divine," 1728. But Chambers attempted to overcome the defect of scattering articles on related subjects, which inheres in the alphabetical arrangement, by a system of cross references.

A new principle appeared in the famous French "Encyclopédie." This work originated in a translation of Chambers' "Cyclopædia," but its revision was finally intrusted to Diderot, who enlisted the co-operation of men like d'Alembert, Rousseau, Voltaire, Montesquieu, and Turgot. It began to appear in 1751, and went on through many difficulties till 1772. It opposed dogmatism in religion and despotism in government, and thus incurred the opposition of both Church and State. No other work of this kind ever attained such importance in political and intellectual history, and it is one of the most influential documents in the history of 18th century thought. Much of it was brilliantly written, and the articles of its more distinguished contributors belong to permanent literature; but as an encyclopædia in the modern sense it lacks proportion, exactness, and impartiality.

These ideals were adopted when a society of gentlemen in Scotland issued in 1771 the first edition of the "Encyclopædia Britannica" in three volumes; and this work, now in its eleventh edition, and expanded to twenty-eight volumes and an index, is the most comprehensive attempt of modern times to include the "whole circle of learning." But its very comprehensiveness has resulted in qualities which unfit it for many purposes. Articles written by eminent authorities are too technical and special for the lay reader, and there is need of a more compact and concise treatment for the uses of these crowded times.

But a more serious limitation attaches not only to the "Encyclopædia Britannica" but to all hitherto existing works of this kind. The Britannica was completed in 1910, and since then the world has gone through the most catastrophic upheaval in historic times.

It is almost impossible to grasp the extent and the profundity of the changes which have been produced by the World War. To realize these is to see that all previous works of reference are now out of date, and to appreciate at a glance the justification and the necessity of this the first post-war Encyclopædia. Let us consider some of the more striking features of which a new compendium of knowledge must take account.

First, there is the history of the great conflict itself. This begins with the political system of Europe as it had been modified by the military and industrial developments of Germany since the defeat of France and the formation of the German Empire in 1870-1871. The diplomatic history of the last fifty years is now to be seen in a new perspective, and the events of the summer of 1914 especially demand study. The course of the actual fighting involves naval events in all the oceans, and land fighting from Flanders eastward to Vladivostok. The forces include the populations of countries hardly known previously to the Western nations, and economic and geographical features hitherto familiar only to specialists. The methods of warfare were throughout the struggle continuously developing, and science was making vast contributions to the agencies of destruction, as well as to the prevention and healing of disease and wounds. Great figures of the pre-war period suffered eclipse and new personalities emerged. Almost every branch of human thought was affected by the impact on the minds of men of the unexpected turn of events and by the unforeseen developments of the psychology of nations and of individuals. The treaties which brought the conflict to a formal close have modified the frontiers of half the countries of the world, and have produced an entirely new arrangement of economic forces; while inside the various countries the experiences of the war have produced far-reaching changes in industrial economy and the position of women.

This is but a sketch of some of the main considerations which show how unavoidable is the recasting of a work like the present which attempts to hold a mirror up to the world. The task of revision has been no easy one, especially since so much is still unsettled. But to follow the events that each day is still bringing forth men need to have accessible a precise account of what has happened in the last seven years.

In the attempt to render this service the editors of the present work have had the Great War itself treated in a compendious

article of thirty-eight pages, covering the whole military record; while the part played by our own country is treated under the article "The United States." Similarly the achievements of the other nations involved are recounted under the names of the different countries, and special articles deal with the greater battles, such as the Marne, the Meuse-Argonne, the Isonzo, and Jutland. The Navy of the United States has been intrusted to Rear-Admiral Austin M. Knight, who writes also on such allied subjects as Blockade, Torpedoes, Safety at Sea, and International Law. The modifications of methods of warfare are described, and special articles are devoted to poison gas, tanks, aeroplanes, artillery, and the like. Dr. Joseph H. Odell, one of the Advisory Board, has summarized the activities of the Red Cross, and has dealt with the completed career of Theodore Roosevelt. To President Sills were intrusted the career of Woodrow Wilson and the account of the Peace Treaty. Other advisory editors have taken active part in the task of describing the New World. Maps have been brought up to date, and the geographical data in general made more adequate for the understanding of the problems of the hour.

All the new material, however, is by no means the result of the war. The census of 1920 has made it possible to include new figures for all the cities and States of the United States, all towns of over 5,000 inhabitants being now listed. The generalizations based on the census are summarized in the general article "Census." The progress of science outside of warfare, the advance of medicine and mechanical invention, the evolution of motor vehicles, the rise of the moving picture, new economic and industrial developments, recent political changes, all have called for new treatment.

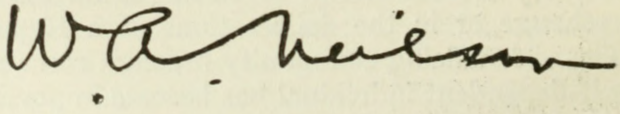
Meantime, amid all the confusion and revolution, scholars have not intermitted their labors, and the harvest of their efforts is gathered up in the revision of articles on literature and philosophy. Education, physical, technical, professional, and general has progressed; and one of the striking by-products of the war has been the fresh realization of the necessity of more and better education if the world is to make permanent progress. These themes have been handled by authorities like President Thwing, Chancellor Kirkland, and Professor Councilman, all of the Advisory Board. The problem of the assimilation of the various elements of our immigrant population is discussed by Dr. Odell under "Americanization of Foreigners" and allied topics in various articles on

the Negro. The special phases of education have received attention at the hands of Drs. Thwing and Sills. The former has contributed articles on legal education, coeducation, technical education, and colleges; the latter, articles on medical education and physical education. Professor Irving Fisher has written an illuminating article on Capital. Chancellor Kirkland's contributions include articles on university extension and universities in America. A remarkable series of biographies has been prepared by Dr. Edwin Greenlaw, who also wrote the articles on Bacon, Emerson, Hawthorne, Irving, Milton, Raleigh, Sir Philip Sidney, Spenser, Whitman, and Whittier. Dr. Henry S. Canby of the Advisory Board has written for the Encyclopædia a brilliant article on the short story. Dr. Councilman has prepared articles on physical education, biology, and eugenics. All the statistical matter has been brought up to the latest possible date, so that, in respect to correspondence to the facts as they are at the present moment, the Encyclopædia can claim to be the most complete work of reference of its sort in existence.

The nature and amount of knowledge with which a man can get through life has varied enormously according to time and circumstances. A South Sea islander, to whom nature supplies food almost without effort on his part and for whom climate makes clothing and shelter almost matters of indifference, needs to trouble little about politics, foreign or domestic, and may be so little curious that he does not miss the results of science. A Lloyd George or a Wilson at the Peace Table, planning for the future of a world, has need of all knowledge. It is not so long since even in our United States there were many whose intellectual appetites and whose needs lay nearer to the former than the latter. But this time has gone by. There is not the remotest farmer on our prairies whose welfare is not involved in the fluctuations of international exchange or in the deliberations of a Reparations Commission. The self-sufficing community becomes rarer and rarer, the purely self-dependent individual has become impossible. In the Western World democracy has given every man a voice in his government, and his government has a voice in the affairs of all other governments. We are all importers and exporters, direct or indirect, and our merely personal affairs force us to look abroad with interest or anxiety. Education is no longer a thing to be forced on the unwilling, because he does not feel the need of it; it is sought for because the common man is perplexed and knows his need to be in-

formed. So we have to act on historical grounds, however little history we may know; our farm or our business depends for its prosperity on conditions in parts of the world which we can no longer leave to the writers of the school geography. The man least interested in mechanics is forced to learn the principles of the motor; the healthiest of us is no longer at ease without some knowledge of preventive medicine.

We are surrounded by oceans of print, but our newspapers are full of inaccuracies, and their despatches, even when well informed, call for further information to be intelligible. We realize as never before the inconveniences and the perils of ignorance. In point of time we are, as it were, standing on a great watershed of history—a height of land between the slope down which run streams back into the distances of the pre-war period, and the slope down which are beginning to wear their channels the currents of the new time. We are all agents in determining the course of these currents. We need to know, as we stand on the Great Divide, the signs of wind and sky and the points of the compass. A great work of reference is our chief resort for the information that we must have if we are to save ourselves and be intelligent and beneficent as members of the society of the future. The two great needs of the day are the power to think clearly and logically, and the knowledge of the facts with which our thinking is to deal. The power to think can come only through hard and persistent and conscientious effort; the facts are to be had for the seeking. It has been the effort of the makers of this book to make these facts available, to arrange them for the greatest convenience of the reader, to corroborate them so that they can be trusted. The editors have finished their task, and they hand the results to the reader that he may take up his.



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"A—BERNARD"

Key to Pronunciation

ā as in pale, mate. Also see ĕ, below.
ȧ " " chaotic, lend.
â " " rare, care.
ă " " lamb.
ä " " farm.
á " " pant, and final *a* in America. armada, etc.
a̤ " " tall.
ē " " feel.
ė̄ " " emerge.
ĕ " " rend. The characters *ĕ*, *ā*, and *â* are used for *ä*, *ae* in German, as in Baedeker, Gräfe, Händel. The sound of Swedish *ä* is also sometimes indicated by *ĕ*, sometimes by *â* or *ă*.
ē " " learn, fern, her, and as *i* in stir.
e̲ " " lent, where it is of a neutral or obscure quality.
ī " " mice.
ĭ " " fill, ill, fit.
ō " " told.
ȱ " " sobriety.
ô " " for.
ŏ " " pot.
oi as in toil, and for *eu* in German.
o͞o " " mood, food, fool, and as *u* in rule.
ou " " mouse.
ū " " rule.
ŭ " " rut.
u̱ " " pull, put, or as *oo* in book. Also for *ü* in German, and *u* in French.
û " " turn, urn, burn.
y " " yield.
ch " " choose.
g " " gold.
hw " *wh* in what.
n̲ " in monger.
ng " " song.
sh " " show.
th " " thing.
zh " *z* in azure, and *s* in pleasure.

Sometimes apostrophes are used to indicate a neutral or connecting vowel. Where the accent of a syllable indicates clearly its pronunciation, no attempt is made of respelling the word. This is true of most common English words and words which are plainly pronounced as they are spelled.

A

A, a, the first letter in the English alphabet, as in those of all the modern Indo-European tongues. The Latin alphabet also commences with *a*, and the Greek with a similar letter, *alpha*. In Sanscrit the vowels are classified by grammarians separately from the consonants. The vowels are placed first, and two sounds of *a*, the first a very short one, intermediate between *ă* and *ŭ*, as in the word *Veda*, and the other long, as in the first syllable of *Brahman*, head the list. In the Semitic, also, more accurately called the Syro-Arabian, family of languages, a letter with the *a* sound stands first in order. Thus the Hebrew alphabet commences with A (*Aleph*), followed in succession by B (*Beth*), C (*Gimel*), D (*Daleth*), designations which at once suggest the names of the Greek letters *Alpha, Beta, Gamma, Delta*. The old Hebrew, the Aramæan, and the Greek letters seem to have come from the Phœnician, a Syro-Arabian tongue. The Phœnician letters, again, as Gesenius suggests, may have been derived from the Egyptian hieroglyphics.

A as an initial is used:

1. In chronology, for *Anno* (Lat.)= in the year, as A. D., *Anno Domini* = in the year of our Lord; A. U. C., *Anno urbis conditæ* = in the year of the city founded —*i. e.*, from the foundation of the city (Rome)=753 B. C. (*Varro*).

2. In horology, for the Lat. prep. *ante* =before, as a. m. (*ante meridiem*)=before noon.

3. In designating university degrees, for *Artium*, as A. M. (Lat.), or M. A. (Eng.), *Artium Magister* = Master of Arts; A. B. (Lat.), or B. A. (Eng.), *Artium Baccalaureus* = Bachelor of Arts.

4. In music, for alto, as S. A. T. B.= soprano, alto, tenor, bass.

5. In nautical language, for able. Thus, A. B. = able-bodied seaman.

6. In commerce, for accepted, and is used specially of bills.

A as a symbol stands for:

1. In logic, a universal affirmative.

2. In music, the 6th note of the diatonic scale of C major, corresponding to the *la* of the Italians and the French.

3. In heraldry, the chief in an escutcheon.

4. In nautical language, A-1 = a vessel of the first class, excellently built. Figuratively, anything highly excellent; the best of its class.

5. In mathematics, A and the other letters of the alphabet are used, *e. g.*, in Euclid, to represent lines, angles, points, etc. In algebra, *a* and the other first letters of the alphabet are used to express known quantities, and the last letter to express such as are unknown.

AACHEN. See AIX-LA-CHAPELLE.

AALBORG, one of the most ancient cities of Denmark, the capital of the district of the same name, in Jutland, on the Limfjord and on the Danish State railway. It is the seat of a bishop and has a cathedral, a museum, a library, and schools. It is important as a commercial and manufacturing center. Pop. about 35,000.

AAR (är), the most considerable river in Switzerland, after the Rhine and Rhone. It forms at Handeck, in the valley of Hasli, a magnificent waterfall of above 150 feet in height, and empties into the Rhine, opposite Waldshut, after a course of about 170 miles.

AARAU (ä'rou), a town in Switzerland, capital of the canton of Aargau, on the right bank of the Aar. Has manufactures of scientific instruments, silk, cotton, leather, and bells, a library, and historic, scientific, and ethnographic museums. Here, in December, 1797, the ancient Swiss confederacy held its last session; from April to September, 1798, it was capital of the Helvetic republic. Pop. about 10,000.

AARD-VARK, the *orycteropus capensis*, an insectivorous animal which partakes of the nature both of the ant-eater and the armadillo; agreeing with the former in its general habits, but, al-

though entirely destitute of scaly armor, more resembling the latter as to its anatomical structure. The aard-vark measures about 5 feet to the end of the tail: its skin is thick, coarse, and covered with stiff hair; the limbs short, thick, and very muscular. This animal is very common in Cape Colony.

AARD-WOLF, the *Proteles Lalandii*, a singular carnivorous animal, first brought from south Africa by the traveler Delalande. It forms the connecting link between three genera widely separated from each other, having externally the appearance and bone structure of the hyena united to the head and feet of the fox, with the intestines of the civet.

AARGAU (är'gou), or **ARGOVIA**, one of the cantons of Switzerland, bounded on the N. by the river Rhine, on the E. by Zurich and Zug, on the S. by Lucerne and Berne, and on the W. by Soleure and Basel. Area, 542 square miles of well cultivated soil and extensive vineyards. This is one of the cantons most distinguished for industry and generally diffused prosperity. Pop. about 250,000.

AARHUUS (-hös), one of the districts into which Denmark is divided. It embraces the most eastern part of the peninsula of Jutland, and is divided into two bailiwicks, Aarhuus and Randers. Area, 1,821 square miles. Pop. about 225,000, chiefly occupied in the fisheries.

AARHUUS, a city, the capital of the bailiwick of the same name. It is situated on the Cattegat. Pop. about 65,000. The harbor is small, but good and secure.

AARON, son of Amram (tribe of Levi), elder brother of Moses, and divinely appointed to be his spokesman in the embassy to the court of Pharaoh. By the same authority, avouched in the budding of his rod, he was chosen the first high-priest. He was recreant to his trust in the absence of Moses upon the Mount, and made the golden calf for the people to worship. He died on Mount Hor in the 123d year of his age; and the high-priesthood descended to his third son, Eleazar.

Aaron's rod, in archæology, is a rod like that of Mercury, but with only one serpent, instead of two, twined around it.

AB, the eleventh month of the civil year of the Hebrews, and the fifth of their ecclesiastical year. It corresponds to part of our month of July and to the beginning of August; it consists of 30 days. The first and ninth days are fast days, commemorating respectively the death of Aaron and the destruction of the first and second temples.

ABABDEH, ABABDE, or ABABIDEK, a people of eastern Africa, scattered throughout Nubia, and between the borders of the valley of the Nile and the Red Sea, but located chiefly from latitude 23° to the western border of Lower Egypt.

ABACO, GREAT and LITTLE, two islands of the Bahamas, West Indies. Combined area about 879 square miles. Pop. about 5,000.

ABACUS, in architecture, a constituent part of the capital of a column, which supports the horizontal entablement.

In arithmetic, the name of an instrument employed to teach the elementary principles of the science of numbers. The Chinese abacus is also an instrument for facilitating arithmetical calculations. It consists of several series of beads or counters strung upon brass wires stretched from the top to the bottom of an instrument, and divided in the middle by a cross-piece from side to side. In the upper compartment every wire has two beads, each of which counts five; in the lower space every wire has five beads of different values; the first being counted as one, the second as 10, the third as 100, and so on.

ABAKANSK, a range of mountains in the government of Tomsk, in Siberia, extending from the river Tom to the Yenisei, parallel to the Altai mountains. Also the name of a fortified town of Siberia, in the government of Tomsk, on the river Abakan. This is considered the mildest and most salubrious place in Siberia.

ABANCAY, a district of Peru, in the department of Cuzco. The plains produce rich crops of sugar cane and the principal cereals. The mountains afford gold and silver, and pasturage for large herds of cattle. The chief town is Abancay, 50 miles from Cuzco.

ABANO BAGNI, a town in the province of Padua, Italy, 29 miles from Venice. It is visited by invalids for the benefit of its hot sulphur springs, which were well known to the ancients as *Fontes Aponi*. Pop. about 6,000.

ABARIM, the range of highlands, or mountains, to the E. of the Jordan, in the land of Moab. The highest point is Mount Nebo, where Moses is supposed to have died.

ABATTOIR. See PACKING INDUSTRY.

ABBAS PASHA HILMI, Khedive of Egypt, born in 1874, oldest son of the Khedive Mehemet-Tewfik. He studied at the Theresianum at Vienna. On his fa-

ther's death in 1892 he became Khedive. In 1893 he dismissed four of his ministers, but Lord Cromer interfered and he agreed to follow England's recommendations in all important matters. At the outbreak of the World War, the Khedive was the guest of the Sultan at Constantinople. On Dec. 18, 1914, the British Foreign Office announced a protectorate over Egypt. In a proclamation issued the following day, Abbas Hilmi was referred to as "lately Khedive of Egypt, who had adhered to the King's enemies" and it was declared that he had been deposed. The title of Khedive was abolished and that of Sultan was substituted. See EGYPT.

ABBASSIDES, the name of a dynasty who possessed the caliphate for 524 years. There were 37 caliphs of this dynasty who succeeded one another without interruption. They claimed descent from Abbas, the uncle of Mohammed. The most famous caliphs of this dynasty were Almansur and Harun-al-Rashid. The last Abbasside to be caliph at Bagdad was Mustasim, who was put to death by Hulaku Khan, a Mongolian ruler of Persia, in 1258.

ABBAZIA, a famous health resort on the Gulf of Quarnero (Adriatic Sea), about 10 miles W. of Fiume. The permanent population is only about 2,500, mostly Croats. About 40,000 visitors frequent it annually.

ABBÉ (äb-ā′), originally the French name for an abbot, but often used in the general sense of a priest or clergyman.

ABBE, CLEVELAND, an American meteorologist; born in New York City, Dec. 3, 1838, he was director of the Cincinnati Observatory from 1868 to 1873. Since 1871 he has prepared the official weather forecasts and storm warnings issued from Washington and in 1891 was appointed meteorologist of the U. S. Weather Bureau. He was instrumental in greatly advancing the science of meteorology and was honored by numerous institutions of learning and science. He published several important books on meteorology and allied subjects. He died in 1916.

ABBEVILLE, town and county-seat of Abbeville co., S. C., on the Southern and the Seaboard Air Line railroads; 106 miles W. by N. W. of Columbia, the State capital. It is in a rich, cotton-growing region; is noted for its fine climate, which makes it a popular resort for Northern invalids, and has a National bank, excellent public schools, and several large manufactories connected with the cotton industry. Pop. (1910) 4,459; (1920) 4,570.

ABBEVILLE, a city of France, capital of the *arrondissement* of the same name (department of the Somme), situated on both sides of the river Somme, 12 miles above its mouth. It is one of the most thriving manufacturing towns in France. Besides black cloths of the best quality, there are produced velvets, cottons, linens, serges, sackings, hosiery, packthread, jewelry, soaps, glasswares, etc. Its most interesting building is the church of St. Wolfram, begun in 1488, one of the richest existing examples of the flamboyant style. Pop. about 20,000.

ABBEY. See MONASTERY.

ABBEY, EDWIN AUSTIN, an American artist; born in Philadelphia, April 1, 1852. Besides illustrating many books



EDWIN A. ABBEY

and painting a number of notable pictures, he designed a series of 15 paintings for the walls of the Boston Public Library, on the subject of the "Holy Grail." During the last 10 years of his life he executed a series of brilliant mural paintings in the Pennsylvania State Capitol at Harrisburg. The greater part of his artistic life was spent in London, where he died in August, 1911. His works are especially noted for their brilliant coloring, romantic treatment, and historic accuracy.

ABBEY, HENRY EUGENE, an American operatic manager; born in Akron, O., June 27, 1846; was engaged for several years in theatrical, and, from 1883, in operatic management, producing Italian and German operas with the most distinguished singers of the day. He died in 1896.

ABBOT, the superior of a monastery of monks erected into an abbey or priory. the principal distinction observed between abbots are those of regular and commendatory. The former take the vow and wear the habit of their order: whereas the latter are seculars, who have received tonsure, but are obliged by their bulls to take orders when of proper age. Other distinctions also arose among abbots when abbeys were flourishing in Europe; as, mitered, those privileged to wear the miter and exercise episcopal authority within their respective precincts; crosiered, so named from their carrying the crosier, or pastoral staff; ecumenical, such as exercised universal dominion; and cardinal, from their superiority over all others.

ABBOTSFORD, the home of Sir Walter Scott, situated on the S. bank of the Tweed, and a few miles above Melrose. It takes its name from a ford formerly used by the monks of Melrose.

ABBOTT, ALEXANDER CREVER, an American hygienist, born in Baltimore, Md., Feb. 26, 1860; was educated at the University of Maryland, Johns Hopkins University, and the universities of Munich and Berlin. He is a member of numerous scientific societies, and, since 1897, has been Professor of Hygiene and director of the laboratory of hygiene in the University of Pennsylvania.

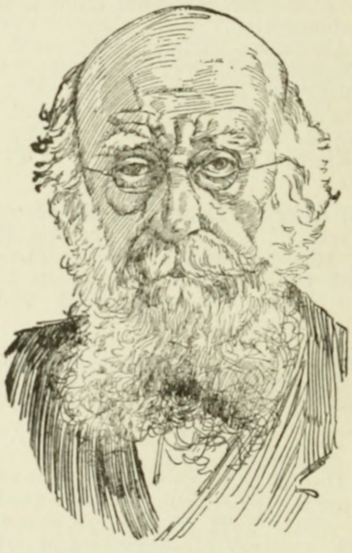
ABBOTT, BENJAMIN VAUGHAN, an American lawyer and legal writer, born in Boston, Mass., June 4, 1830. He published a number of able works on legal subjects, among them a revision of the United States Statutes. He died in Brooklyn, N. Y., Feb. 17, 1890.

ABBOTT, CHARLES GREELEY, an American astrophysicist, born in Wilton, N. H., in 1872. He graduated from the Massachusetts Institute of Technology in 1894 and in the following year joined the staff of the Smithsonian Astrophysical Observatory, of which institution he became director in 1907. He is a member of many astronomical and other scientific societies, and has done valuable research work in connection with solar phenomena. He published "The Sun" (1911).

ABBOTT, EMMA, American dramatic soprano, born in Chicago, Ill., in December, 1849. She sang in opera with great success. She died in Salt Lake City, Utah, Jan. 5, 1891.

ABBOTT, JACOB, an American writer, born in Hallowell, Me., Nov. 14, 1803. His works, comprising over 200 titles, chiefly of stories for the young, were widely read in his own day. Among the best known are "The Rollo Books" (28 vols.); "The Franconia Stories" (10 vols.); "The Marco Paul Series" (6 vols.). He died in Farmington, Me., Oct. 31, 1879.

ABBOTT, LYMAN, an American clergyman, born at Roxbury, Mass., Dec. 18, 1835. At first a lawyer, he was ordained minister of the Congregational



LYMAN ABBOTT

Church in 1860. After a pastorate of five years, in Indiana, he went to New York, and rose rapidly to distinction through his contribution to periodical literature. He was pastor of Plymouth Church, Brooklyn, in 1888-1898, being the immediate successor of Henry Ward Beecher. He was associated with Mr. Beecher in the editorship of the "Christian Union," and in 1893 became editor of "The Outlook," formerly the "Christian Union." His writings include "Jesus of Nazareth" (1869); a "Life of Henry Ward Beecher" (1903); "In Aid of Faith" (1886); "Christianity and Social Problems" (1896); "Life and Letters of Paul" (1898); "The Rights of Man" (1901); "The Great Companion" (1904);

"The Spirit of Democracy (1910); "Letters to Unknown Friends" (1913); etc.

ABBREVIATIONS. See APPENDIX in last volume.

ABDALLAH, BEN-ABD-EL-MOTTALIB, father of Mohammed, born at Mecca, A. D. 545; died 570. The paternity of the Prophet is Abdallah's sole claim to distinction.

ABDAL-MALEK, or **ABDULMELECH,** the son of Mirvan, and the fifth caliph of the race of the Ommiades. In his reign the Indies were conquered in the East, and his armies penetrated Spain in the West; he likewise extended his empire toward the South by making himself master of Medina and Mecca. He began his reign in the 65th year of the Hegira, A. D. 684; reigned 25 years and four of his sons successively enjoyed the caliphate.

ABD-EL-KADER (-gä'der), was the third son of a marabout of the Arab tribe of Hashem. Born in Oran in 1807, the early days of Abd-el-Kader are lost in obscurity, but by 1828 he had not only acquired the reputation of a scholar, but that of a saint, from his having twice made a pilgrimage to Mecca. Accompanied by his father, he preached a holy war against the French occupation of Algiers, and called upon the faithful to rise and expel the infidels. In 1832, he found himself at the head of 10,000 warriors with whom he attacked Oran, but was several times repulsed with great slaughter. For a period of 15 years he contrived to defend his country, and fight against the encroachments of France; but in 1847 he was compelled to surrender. In 1852 Louis Napoleon restored him to freedom on condition that he would not return to Algiers, or conspire against the French. He died in Damascus, May 26, 1883.

ABD-ER-RAHMAN I., a Caliph of Cordova, born in Damascus in 731. He founded a Moorish dynasty in Spain, made Cordova his capital and became an independent sovereign. Notwithstanding many rebellions and an expedition sent against him by Charlemagne he maintained his power. The mosque at Cordova (now used as a cathedral), ornamented with rows of cupolas, supported by 850 pillars of jasper, was built by him. He died in 787.

ABD-ER-RAHMAN III., a Caliph of Cordova, born in 891. From his earliest youth his ambition was to aggrandize the Saracen power in Spain, a purpose he carried out with a success so brilliant as to win for him the title of "the Great." He ascended the throne in 912 and set himself the task of reviving learning, fostering trade and beautifying his capital. His long reign of 49 years is pronounced the glorious epoch of Moorish sway in Spain. He died in 961.

ABDICATION, the relinquishment of an office, and particularly the throne, without a formal resignation. It differs from resignation, which is applied to the giving back by a person into the hands of a superior an office to which that superior appointed him; while in abdication one, theoretically without an earthly superior in the country, relinquishes what came to him at first by act of law.

ABDOMEN (1) That portion of the trunk which in man commences beneath, and in mammalia behind, the diaphragm, and terminates at the extremity of the pelvis. The abdominal cavity is the largest in the human body. It is lined with a serous membrane, called the peritoneum. It contains the liver, with the gall-bladder, under its right lobe, the stomach, the pancreas, the spleen, the two kidneys, the bladder and the intestines. The more highly organized of the inferior animals have a similar structure. (2) In entomology, the whole posterior division of the body of an insect, united to the thorax by a small knot or attachment, well seen in the wasp. It includes the back as well as the parts below. Externally it is made up of a series of rings.

ABDOMINALS, an order of malacopterygious fishes, having the ventral fins under the abdomen behind the pectorals, as the trout. They comprehend the greater part of fresh water fishes, and constitute the fourth order of the fourth class of animals in the Linnæan system.

ABDUCTION, the act of abducing or abducting; a taking or drawing away, and specifically an unlawful taking. In law, the forcible and fraudulent taking away of women or girls.

ABDUCTOR, a muscle, the office of which is to pull back or draw the member to which it is affixed from some other. The antagonist is called adductor. In law, a person guilty of abduction.

ABD-UL-AZIZ, the 32d Sultan of the Ottoman Turks, was born Feb. 9, 1830, and succeeded his brother, Abd-ul-Medjid, in 1861. His government had great difficulties to contend with in the Cretan insurrection, the struggle of Rumania and Servia for full autonomy, and finally the outbreak of Mohammedan fanaticism. In 1871, the Sultan strove to get the suc-

cession settled upon his son, instead of his nephew Murad, in accordance with Turkish custom. He next entered into intrigues with Russia, and plunged ever into deeper financial difficulties. At last a conspiracy forced him to abdicate the throne, May 30, 1876. Four days later, he was found dead.

ABDUL-HAMID II., 34th Sultan of Turkey, born Sept. 22, 1842, the second son of the Sultan Abdul-Medjid; succeeded to the throne in 1876, on the deposition of his brother, Murad V. De-



ABDUL-HAMID II.

feated in the war of 1877-1878 with Russia, he was compelled by the Treaty of Berlin to surrender a small portion of territory in Europe and Asia, to recognize the independence of the suzerain states in Europe, and to acknowledge Bulgaria as a tributary principality. In 1895-1896, during the massacres of the Armenians, he took an active part in the negotiations with the European powers, and communicated personally with Lord Salisbury, protesting his intention to grant an investigation and the reforms urged by the powers. In 1897, Greece forced war on Turkey in behalf of the Cretans, and in 1898 Great Britain and Russia forced Turkey to evacuate the island. As the years progressed, the Sultan's rule became steadily more despotic and sanguinary, until he had won the sobriquet of "Abdul the Damned." It was only when a rebellion broke out in Macedonia, July 22, 1908, that Abdul became alarmed and restored the Constitution which he had abrogated thirty years before. The new Turkish Parliament opened Jan. 15, 1909. On April 14 following, the Sultan instigated a counter-revolution that failed. April 24, forces of the Young Turks entered the capital and took possession of the person of the Sultan. He was banished temporarily to Salonica, whence he was brought back, Nov. 12, 1912, to Constantinople and confined in a palace on the Asiatic side of the Bosporus. He died Feb. 10, 1918.

ABDUL-MEDJID, a Sultan of Turkey, born April 23, 1822; succeeded to the throne July 1, 1839, at the early age of 17, eight days after the battle of Nezib, in which the troops of the Sultan Mahmoud II. were defeated by Ibrahim-Pasha. The interference of the allied powers alone prevented the empire from dismemberment at this juncture. The great event of his reign was the Crimean War, in which France and England allied themselves with Turkey against the encroachments of Russia, and which was terminated by the fall of Sebastopol after a long siege, in 1856. He was succeeded by his brother, Abdul-Aziz Khan. He died June 25, 1861.

ABDURRAHMAN KHAN, Ameer of Afghanistan, was born in 1845, the eldest son of Ufzul Khan, and nephew of the Ameer Shere Ali. During the civil war, in 1864, in Afghanistan, the great victories of Shaikhabad and Khelat-i-Ghilzai were mainly due to his ability. In 1868, however, he was unable to offer a successful resistance to his cousin, Yakoub Khan, who defeated him at Tinah Khan. Abdurrahman then fled from the country. The Russian General Kaufmann permitted him to reside at Samarcand. Here he remained until 1879, when he slowly made his way through Balkh to the Kabul frontier, and in July of 1880 he was formally chosen by the leading men of Kabul and acknowledged by the British Indian Government as Ameer of Afghanistan. In March, 1900, he made an official declaration of his sympathy with England. Died Oct. 1, 1901, and was succeeded by his eldest son, Habibullah Khan.

À BECKET, THOMAS. See BECKET.

ABEL, the second son of Adam and brother of Cain. The latter was a tiller of the ground; Abel, a shepherd. Both brought their offerings before the Lord; Cain, the first-fruits of the ground; Abel, the firstlings of the flock. God accepted the offering of Abel; the offering of Cain he rejected. The latter, instigated by envy, murdered his brother in the field.

ABÉLARD, PIERRE (ä-bā-lär'), a French scholastic philosopher and theologian, born near Nantes, 1079. Lectur-

ing on theology, he attracted students from all parts of Europe. Several of his disciples afterward became famous; for example, Pope Celestin II., Peter Lombard, Berengarius, and Arnold of Brescia. The story of his romantic and tragic love for Héloïse is told in his "Story of My Misfortunes," in her first "Letter" to him on receipt of the "Story," and in the two "Letters" from her that followed. The poets have taken the loves of this unfortunate pair as the theme of their elegies in every age since the death of the lovers. He died April 21, 1142.

ABENCERRAGES (ä-b-ân-sā-räzh'), the name given by Spanish chroniclers to a noble family in the Moorish kingdom of Granada, several of whom distinguished themselves immediately before the fall of the Mahommedan empire in Spain. Their struggles with the family of the Zegris, and tragical destruction in the royal palace of the Alhambra, in Granada (1466-1484), seem to be destitute of historical foundation. On these events, Chateaubriand has written a charming work of fiction, "Les aventures du dernier Abencerrage."

ABERCROMBIE, JOHN, in his day the most eminent of Scottish physicians, was born in 1780, at Aberdeen, where his father was a parish minister. He studied medicine in Edinburgh, taking his degree in 1803. His principal professional writings were treatises on the pathology of the brain and on diseases of the stomach. But he is best known by his works on "The Intellectual Powers" (1830), and "The Moral Feelings" (1833). These works immediately acquired a remarkable popularity. Dr. Abercrombie died suddenly, Nov. 14, 1844.

ABERCROMBIE, SIR RALPH, a British general, born in 1738. He was commander-in-chief in the West Indies, in 1795; in the attempt against Holland, in 1799, and in the expedition to Egypt. Mortally wounded in the beginning of the battle of Alexandria (March 21, 1801), the general kept the field during the day, and died some days after his victory.

ABERDEEN, the chief city and seaport in the N. of Scotland, lies in the S. E. angle of the county at the mouth and on the N. side of the river Dee, 111 miles N. of Edinburgh. William the Lion confirmed its privileges in 1179; the English burned it in 1336, but it was soon rebuilt, and called New Aberdeen. Old Aberdeen, within the same parliamentary boundary, is a small town a mile to the N., near the mouth of the Don, and is the seat of St. Machar's Cathedral (1357-1527), now represented by the granite nave, which, as restored since 1869, is used as a parish church. Among the chief public edifices are the county buildings, the postoffice, the Market Hall, the Trades Hall, the Royal Infirmary, the lunatic asylum, the grammar school, the art gallery and art school, and Gordon's College. The chief exports are woolens, linens, cotton-yarns, paper, combs, granite (hewn and polished), cattle, grain, preserved provisions, and fish. Aberdeen has the largest comb and granite-polishing works in the kingdom. There are also several large paper works. Aberdeen is at the junction of three railway lines and has steamer connections with Leith, Newcastle, Hull, and London. The trade of the port, which has an excellent harbor, has steadily increased. In 1911 the net tonnage of vessels arriving was 1,041,424, and departing, 1,020,498. In the same year the imports were valued at over £1,163,000, and exports at over £1,496,000. Municipal ownership has been extended to its water and gas works, its electric light plant and tramways, public baths, markets, and cemeteries. Its ratable property value in 1920 was more than £1,000,000. Aberdeen is represented in Parliament by two members. The population of the parliamentary burgh is estimated (1918) at 166,000.

ABERDEEN, a city in South Dakota, the county-seat of Brown co. It is on the Chicago, Milwaukee and St. Paul, the Chicago and Northwestern, the Minneapolis and St. Louis, and the Great Northern railroads, and contains many handsome public buildings, including a library, municipal building, court house, Federal building, etc. There are parks, and a fine school system, including a State Normal and an Industrial School. The city is important as a manufacturing center, especially for flour, brick, chemicals, clothing, and machinery. The town was settled in 1880. Pop. (1910) 10,753; (1920,) 14,537.

ABERDEEN, a city of Washington, in Chehalis co. It is on the Chehalis river and on the Northern Pacific, the Chicago, Milwaukee and St. Paul, and the Oregon and Washington Railway and Navigation Co., and is connected by steamship with ports in California. The city is the center of an important lumber and agricultural region. The chief industries are logging, shingle mills, ship yards, and packing houses. Pop. (1910) 13,660; (1920) 15,337.

ABERDEEN, GEORGE HAMILTON GORDON, EARL OF, born in 1784. He took office as Secretary of State for Foreign Affairs in 1828, in the ministry

formed under the Duke of Wellington, and in 1843 in the Peel ministry. In 1853, Earl Aberdeen was selected to head a new ministry, which for some time was extremely popular. He endeavored to prevent the country from entering upon the conflict with Russia, but all his efforts were unvailing. Failing to receive sufficient support to carry out his measures, he resigned in 1855. Died Dec. 14, 1860.

ABERDEEN, UNIVERSITY OF, an institution for higher education at Aberdeen, Scotland. It includes two colleges, King's and Marischal. The university is coeducational and has about 1,300 students. The chancellor in 1920 was the Duke of Richmond and Gordon, and the vice-chancellor and principal, Sir George Adam Smith.

ABERNETHY, a town in Perthshire, Scotland, near the junction of the Earn and the Tay. Here the first Culdee monastery was built, and here, it is said, the Pictish kings had their capital. A curious round tower, 73 feet high, still exists, resembling the famous round towers of Ireland.

ABERNETHY, JAMES, a Scotch civil engineer, born in Aberdeen in 1815. As a boy he assisted his father on the extension of the London docks, and afterward designed and built the lock and dock at Aberdeen, the docks at Swansea, Newport, Cardiff, and Hull, and the Cavour canal in Italy. He died in 1896.

ABERNETHY, JOHN, an eminent English surgeon, founder of the School of St. Bartholomew's; born in London, April 3, 1764. He was educated at Wolverhampton grammar school, and in 1779 was apprenticed to the assistant surgeon at St. Bartholomew's Hospital. In 1787 he was himself elected assistant surgeon to St. Bartholomew's, and soon after began to lecture. At first, he manifested extraordinary diffidence, but his power soon developed itself, and his lectures at last attracted crowds. His practice increased with his celebrity, which the eccentricity and rudeness of his manners contributed to heighten. He died at Enfield, April 28, 1831.

ABERRATION, a wandering from.

In optics, a spherical aberration is that wandering of the rays of light from the normal path which takes place when they are made to pass through curved lenses, or are reflected from curved mirrors, constituting portions of a sphere, instead of parts of a parabola. Chromatic aberration is the fringing of images with the prismatic colors which takes place when light passes through curved lenses.

In astronomy, the aberration of light is that alteration in the apparent position of a star which is produced by the motion of the earth in its orbit during the time that the light is coming from the star to the eye. The effect of this aberration is to make each star appear annually to describe a minute circle of about 40" diameter parallel to the earth's diameter.

In medicine, the passage of blood, or any other fluid of the body, from morbid causes, into vessels not designed to receive it. Mental aberration is that wandering from soundness of judgment which is so conspicuous in the insane.

ABESTA, or **AVESTA**, the name of one of the sacred books of the Persian magi, which they ascribe to their great founder Zoroaster. The "Abesta" is a commentary on two others of their religious books, called "Zend" and "Pazend"; the three together including the whole system of the Ignicolæ, or worshippers of fire.

ABHEDANANDA, SWAMI, a British-Indian lecturer and author, born in Calcutta in 1860. He was educated at Calcutta University. In 1897 he came to the United States, where he organized the Vendanta Society of New York and acted as its head. He also established several schools for the study of religion and lectured on Hindu philosophy before many educational institutions, societies, etc. He was the author of "Reincarnation" (1899); "Philosophy of Work" (1902); "India and Her People" (1906); "Great Saviors of the World" (1911); etc.

ABIJAH, the second King of Judah, son of Rehoboam, and Solomon's grandson; reigned three years, beginning 956 B. C. He attempted to reunite the divided kingdoms of Israel and Judah. The attempt failed, though he defeated Jeroboam and a superior force, and wrested from the King of Israel several cities.

ABILA, or **ABYLA**, a mountain of Africa, opposite that which is called Calpe, on the coast of Spain, only 18 miles distant. These two mountains are named the Pillars of Hercules, and were supposed formerly to have been united, till the hero separated them, and thereby effected a communication between the Mediterranean Sea and the Atlantic Ocean.

ABILENE, a city of Texas, the county-seat of Taylor co., 160 miles S. W. of Forth Worth. It is on the Texas and Pacific, the Wichita Valley, and the Abilene Southern railroads. The town is an important industrial community. There are flour and planing mills, cotton

oil mills, and cotton gins. The city contains a sanitarium, Federal court house, library, parks, etc. Pop. (1910) 9,204; (1920) 10,274.

ABINGTON, a town in Massachusetts, in Plymouth co., about 20 miles S. E. of Boston. It is on the New York, New Haven and Hartford, and the Old Colony Electric railroads. The largest industry is the manufacture of boots and shoes. The city has an excellent school system and a library. In its park is a memorial arch to veterans of the Civil War which was dedicated in 1912. Abington was founded in 1680. Pop. (1910) 5,455; (1920) 5,787.

ABKHASIA, a region between the south slope of Caucasus and the Black Sea, having an area of about 2,500 square miles. The country is mountainous and has dense forests of oaks and walnuts. Maize, figs, wines, and wheat are produced. Its chief town is Sukhum Kalé. Under the Byzantine emperors it was an independent state, called Abassia. In 1154, the Russian Grand Prince Islayif Mstislavitch married an Abkhasian princess. In the 15th century it became subject to Turkey. After the peace of Adrianople in 1829, the region was annexed to Russia, but was not fully pacified until 1864. The inhabitants differ from the Cherkess in character and appearance. Their principal occupations are agriculture, grazing, wine raising, and bee-keeping. After the Turko-Russian War, many of them emigrated to Turkey. They number about 21,000. Total pop. about 150,000.

ABNOBA, now **ABENAU**, a long range of mountains in Germany, extending from the Rhine to the Neckar, having different names in the different countries through which they stretch: the Oden, or Odenwald, about the river Main; the Spessart, between Hesse and Franconia; Baar, in Württemberg.

ÅBO, a city in the former Russian province of Finland, and chief town of the government of the same name. (Pop. about 525,000.) It is situated near the extremity of the promontory formed by the Gulfs of Bothnia and Finland, and is divided into two parts by the river Aurajoki. Previous to 1817, Abo was the capital of Finland. Pop. about 55,000.

ÅBO, ARCHIPELAGO OF, an extensive group of low, rocky islands in the Baltic Sea, spreading along the S. and W. coasts of Finland, opposite the city of Abo, rendering the navigation difficult and dangerous.

ÅBO, PEACE OF, a treaty concluded Aug. 17, 1743, between Russia and Sweden, by which Russia retained a part of Finland and restored to Sweden the remainder on condition that the latter power should elect the Prince of Holstein-Gottorp successor to the throne. On Aug. 30, 1812, the Emperor Alexander I., of Russia, and the Crown Prince Karl Johann, of Sweden, confirmed the second treaty between the two countries already signed March 24th, containing a secret article of mutual protection. It treated of Napoleon and the subjugation of Norway.

ABOLITIONISTS, in United States history, those who advocated the abolition of African slavery in the Southern States. Agitation became acute after the settlement of the war troubles of 1812-1815. In 1833, the formation of a National Anti-Slavery Society took place in Philadelphia, and in 1848 of the Free Soil Party. The abolition movement was powerfully promoted by William Lloyd Garrison, who issued a newspaper, "The Liberator," for the better dissemination of his views; and also by Wendell Phillips, Charles Sumner, and others. The more extreme agitators among them denied the duty of obedience to the Constitution, since it contained the clause warranting the Fugitive Slave Law, and they denounced it as "a covenant with death and an agreement with hell." In practice they violated it by systematically assisting in the escape of runaway slaves. In Boston, Garrison was mobbed, and the abolition cause in the United States counted among its martyrs Elijah Lovejoy, shot in Alton, Ill., in 1837, and John Brown, hanged in Virginia in 1859. In 1840, the abolitionists divided on the question of the formation of a political anti-slavery party, and the two wings remained active on separate lines to the end. It was largely due to the abolitionists that the Civil War, when it came, was regarded by the North chiefly as an anti-slavery conflict, and they looked upon the Emancipation Proclamation as a vindication of this view.

ABOMA, a large and formidable American snake, called also the ringed boa. It is the *epicratis cenchrea*. Anciently it was worshipped by the Mexicans.

ABOMEY, the former capital of Dahomey, Africa; a walled town, containing several royal palaces. It is mostly clay-built, and the walls are of mud; is of large area, much of which is under cultivation; carries on important trade with the interior in palm oil, ivory, and

gold. It has often been the scene of human sacrifices, especially at the great festivals. The town was captured by the French in 1892. Pop., formerly 60,000, now about 10,000. See DAHOMEY.

ABORIGINES. (1) An old tribe inhabiting Latium. (2) The earliest known inhabitants of any other land. The aborigines of a country, as a subject of scientific investigation, have received great attention since the publication of Herbert Spencer's "Synthetic Philosophy." The greatest discussion has been occasioned by the theories of Morgan with reference to the aborigines of the United States.

ABORTION, the immature product of an organ; any fruit or product that does not come to maturity, or anything which fails in its progress, before it is matured or perfect.

ABOUKIR, a small town of Egypt, about 12 miles E. of Alexandria. In Aboukir Bay, Nelson found the French fleet which had conveyed Bonaparte into Egypt, and destroyed or captured the greatest part of it (Aug. 1, 1798). In other respects, Aboukir is not of much importance.

ABOULFEDA, or **ABULFEDA**, the hereditary prince of Hamah; the most celebrated of the Arabian writers on history and geography. Among his contemporaries he was also distinguished both as a ruler and a warrior.

ABOUT, EDMOND (ā-bō′), a French novelist; born in Dieuze, Lorraine, Feb. 14, 1828. One of the few younger authors of note who adhered to the second empire, he enjoyed the special favor of Napoleon III., and in 1870 accompanied the army of Marshal Macmahon as reporter for "Le Soir." In that paper, after the war, and from 1875 as editor-in-chief of the "XIX. Siècle," he was the champion of the Moderate Republicans. He was elected a member of the Academy in 1884. He died in Paris, Jan. 17, 1885.

ABRACADABRA, a magical word among the ancients, recommended as an antidote against several diseases. It was to be written upon a piece of paper as many times as the word contains letters, omitting the last letter of the former every time, and suspended from the neck by a linen thread. It was the name of a god worshipped by the Syrians, the wearing of whose name was a sort of invocation of his aid. At present, the word is used chiefly in jest, to denote something without meaning.

ABRAHAM, son of Terah, and brother of Nahor and Haran, the progenitor of the Hebrew nation and of several cognate tribes. In obedience to a call of God, Abraham, with his father Terah, his wife Sarah, and his nephew Lot, left his native Ur of the Chaldees, and dwelt for a time in Haran, where Terah died. After his father's death, Abraham, now 75 years old, pursued his course, with Sarah and Lot, to the land of Canaan, whither he was directed by the divine command (Genesis, xii: 5), when he received the general promise that he should become the founder of a great nation, and that all the families of the earth should be blessed in him. As the country was suffering with famine, Abraham journeyed southward to the rich cornlands of Egypt. Abraham left Egypt with great possessions, and, accompanied by Lot, returned to one of his former encampments between Bethel and Ai. Abraham pitched his tent among the oak-groves of Mamre, close to Hebron, where the promise that his descendants should become a mighty nation was confirmed. At the suggestion of Sarah, who despaired of having children of her own, he took as his concubine Hagar, her Egyptian maid, who bare him Ishmael, in the 86th year of his age. Thirteen years elapsed, during which revelation was made that a son of Sarah, and not Ishmael, should inherit both the temporal and spiritual blessings. The covenant was renewed, and the rite of circumcision established as its sign. At length, Isaac, the long-looked-for child, was born, and Ishmael was driven out, with his mother Hagar, as a satisfaction to Sarah's jealousy. Some 25 years after this event, Abraham received the strange command to take Isaac and offer him for a burnt-offering at an appointed place. He hesitated not to obey, but the sacrifice was stayed by the angel of Jehovah. Abraham, at the goodly age of 175, was "gathered to his people."

ABRAHAM, PLAINS OF and **HEIGHTS OF**, a table-land near Quebec, rising above the St. Lawrence, where the battle of Quebec was fought between the British and French (1759). A noble monument now marks the spot.

ABRASIVES, term applied to substances used in polishing and grinding. They include implements fashioned from natural materials, such as grindstones, millstones, whetstones, etc., mineral substances used in a granulated form and artificial abradants.

The familiar grindstone, known from the earliest times, is made from a gritty-tenacious sandstone, found in abundance

in Germany and the British Isles, and plentiful in Ohio and other Western States. Millstones and buhrstones, the latter of which are largely imported from France, are used in grinding coarse cereals, cement rock and certain minerals. The increasing use of the roller process in flour-making has decreased the demand for millstones. Oilstones, scythestones, and whetstones are chiefly of American origin, although an appreciable amount is imported from Belgium, Italy, and France. Pumice is a volcanic ash used in scouring powders and soaps. It is found in Utah and Nebraska, and is also brought from the Lipari Islands. Crystalline quartz is used for sandpaper, garnet for woodworking and shoemaking and corundum for metals, the latter being the hardest material known except the diamond. Alundum is a very efficient abrasive for hardened and toughened steels. Carborundum or carbide of silicon is extensively used in difficult tasks. One of the newest abrasives is electrite, which has a composition between alundum and carborundum. The water power of Niagara Falls is used for the treatment and manufacture of abrasives in great plants that have been established near the Falls.

ABRUZZI (äb-röts'ē), **PRINCE LUIGI AMADEO OF SAVOY-AOSTA, DUKE OF**, Italian explorer; born in Madrid, Jan. 29, 1873; nephew of King Humbert; in May, 1899, he started on an expedition, in the specially prepared steamer "Star of Italy," for Franz Josef Land, intending, when frozen in, to use sledges in a search for the North Pole and the balloon explorer, Dr. Andrée. He returned to Norway in September, 1900, after having reached a point in latitude 86° 33′ N., surpassing Nansen's farthest N. record by 19′. In 1906 he led an expedition into equatorial Africa. A personal feat was the climbing of Mt. Ruwenzori, 16,600 feet high, whose summit, so far as known, had never before been reached. In 1909, he reached the top of Mt. Austen in India, 24,000 feet. During the war with Tripoli, he headed an Italian squadron operating in the Adriatic and Mediterranean. At the outbreak of the World War, he was appointed Commander-in-Chief of the Italian navy, and after the entrance of his own country into the conflict in May, 1915, he acted in co-operation with the allied admirals in controlling the waters of southern Europe.

ABRUZZI AND MOLISE, a political division of Italy, including the provinces of Aquila, Teramo, Chieti, and Campobasso. The Abruzzi is wild and mountainous, the Apennines here reaching their loftiest heights, in Gran Sasso d'Italia nearly 10,000 feet, in the N., and Majella over 9,000, in the S. Cattle-raising is its chief industry. The Molise, comprising the province of Campobasso, yields considerable grain and fruit. Asphalt deposits occur there. The area is 6,387 square miles. Pop. about 1,550,000.

ABSALOM, the third son of David, king of Israel, remarkable for his beauty. He contrived to win the affections of the people, and then stirred up a formidable rebellion. A battle was fought in the forest of Ephraim, in which the rebels were defeated. In the flight, as Absalom was riding under a tree, he was caught in the branches, in which position Joab, the commander of David's army, thrust him through. The grief of David for his loss was excessive.

ABSCESS, a gathering of pus in any tissue or organ of the body. It is so called because there is an *abscessus* (=a going away or departure) of portions of the animal tissue from each other to make room for the suppurated matter lodged between them. It results from the softening of the natural tissues, and the exudations thus produced.

ABSOLUTE, opposed to relative; means that the thing is considered in itself and without reference to other things.

1. Absolute or non-connotative, according to Whately, is opposed to attributive or connotative. The former does not take note of an attribute connected with the object, which the latter does.

2. According to J. S. Mill, it is incorrect to regard non-connotative and absolute as synonymous terms. He considers absolute to mean non-relative, and to be opposed to relative.

In metaphysics, absolute means existing independently of any other cause.

A case absolute, in grammar, is one consisting essentially of a substantive and a participle, which form a clause not agreeing with or governed by any word in the remainder of the sentence. In Greek, the absolute case is the genitive; in Latin, the ablative; in English, it is considered to be the nominative.

In law, personal rights are divided into absolute and relative—absolute, which pertain to men as individuals; and relative, which are incident to them as members of society, standing in various relations to each other. The three chief rights of an absolute kind are the right of personal security, the right of personal liberty, and the right of private property.

Absolute, in natural philosophy, is generally opposed to relative. As this relativity may be of many kinds, various shades of meaning arise, thus:

1. Absolute or real expansion of a liquid, as opposed to its apparent expansion, the expansion which would arise when the liquid is heated, if the vessel containing it did not itself expand. (See Atkinson's "Ganot's Physics," bk. vi, ch. iii.)

2. Absolute gravity is the gravity of a body viewed apart from all modifying influences, as, for instance, of the atmosphere. To ascertain its amount, therefore, the body must be weighed *in vacuo*.

3. Absolute motion is the change of place on a body produced by the motion so designated viewed apart from the modifying influence arising from disturbing elements of another kind.

4. Absolute space is space considered apart from the material bodies in it.

5. Absolute time is time viewed apart from events or any other subjects of mental conception with which it may be associated.

6. Absolute force of a center: Strength of a center.

Absolute zero, an imaginary temperature so low that there would be no heat left.

ABSOLUTION, in ecclesiastical usage, the freeing from sin or its penalties.

ABSORPTION, the act, operation, or process of absorbing, sucking in, or swallowing anything, or otherwise causing it to disappear in another body. Absorption by organized bodies is the taking up or imbibing, by means of their tissues, of material suitable for their nourishment.

In chemistry, absorption is the taking up of a gas by a liquid, or by a porous solid; and in natural philosophy it is the taking up rays of light and heat by certain bodies through which they are passing.

Absorption of heat is the retention and consequent disappearance of rays of heat in passing into or through a body colder than themselves.

Absorption of the earth is a term used by Kircher and others for the subsidence of tracts of land produced by earthquakes or other natural agencies.

ABSTINENCE, the act or habit of refraining from something to which we have a propensity, or in which we find pleasure; but it is more particularly applied to the privation or sparing use of food. Abstinence has been enjoined and practiced for various ends, as sanitary, moral, or religious. Abstinence of flesh on certain days is obligatory in the Roman Catholic Church.

ABSTRACT OF TITLE, an evidence of ownership in the conveyance of property. It aims in abbreviated form to trace as far back as possible or desirable the history of the property, the names of its successive owners and the dates of various transfers. In England, it is customary for the vendor to furnish abstract together with the deed, and this is frequently done in the United States. The practice in this country, however, is becoming less and less common, because of the work done by title companies, who, having assured themselves of the validity and marketability of the title, guarantee the buyer against loss up to the amount of his purchase.

ABSTRACTION, the act of dragging or drawing away or separating. In distillation, it is the operation of separating the volatile parts in distillation from those which do not pass into vapor at the temperature to which the vessel has been raised.

In mental philosophy, it is the act of withdrawing the consciousness from a number of objects with a view to concentrate it on some particular one.

ABT, FRANZ, (äpt), a German song writer; born in Saxony, Dec. 22, 1819. He studied theology at Leipsic, but abandoned it for music. In 1841 he became kapellmeister at the court theater at Bernburg; shortly afterward relinquishing the post for a similar one in Zurich, where he remained till 1852. In 1882 he retired to Wiesbaden. Many of his songs (for example, "When the Swallows Homeward Fly," "Good Night, Thou Child of My Heart," "O Ye Tears," etc.), have endeared themselves to the heart of the people all over the world. He died March 31, 1885.

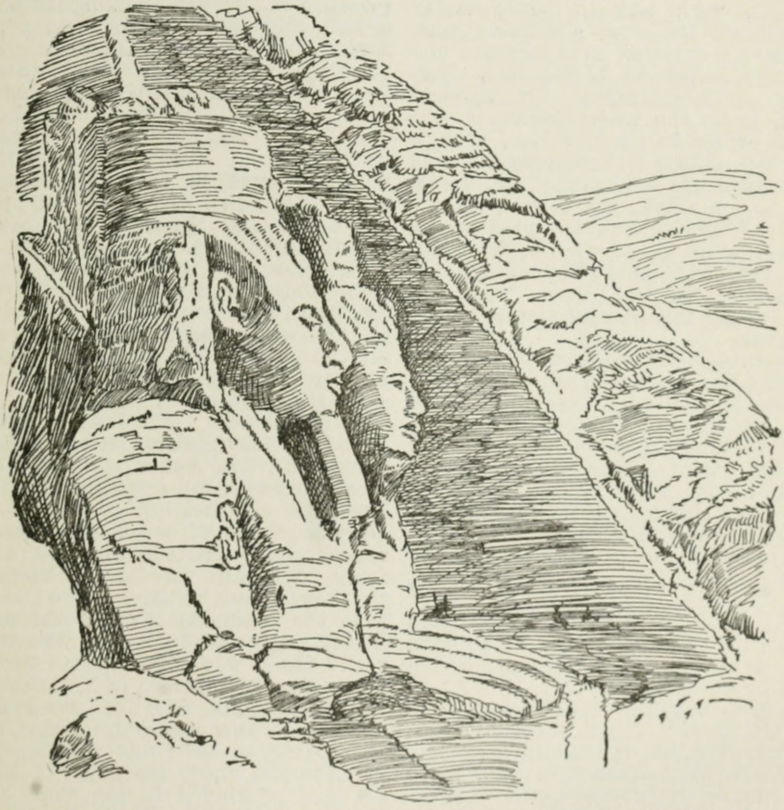
ABU, a mountain, 5,650 feet, in the territory of Serohee, Rajputana, India, a detached granite mass rising like an island from the plain of Marwar, near the Aravalli ridge. It is a celebrated place of pilgrimage.

ABU-BEKR, the father of Ayesha, wife of Mohammed, was a man of great influence in the Koreish tribe; and in 632, when Mohammed died, was made the first caliph or successor of the Prophet. After defeating his enemies in Arabia, and warring successfully against Babylonia, Syria, and the Byzantine emperor Heraclius, Abu-Bekr died 634 A. D., aged 63. He was surnamed "The Just."

ABU-SIMBEL, the ancient Aboccis or Abuncis, a place of ruins in Upper Egypt, between the first and second cataract, having two temples built by Ramses the Great in 1388 and 1392, one for himself and one for the god Hathor. They lie a short distance apart, at the foot of a precipitous cliff close to the west bank of the Nile. No temple in Egypt produces so grand an effect as the rock temple of Ramses II., and by moonlight its effect is even finer. Its dignified sculptures and the gorgeous colored representations

ABYDOS, a town and castle of Anatolia, on the Straits of Gallipoli. In its neighborhood Xerxes, when he invaded Greece, crossed with his immense army the Hellespont, on a bridge of boats. Memorable also from being the scene of the loves of Hero and Leander, and from Byron having adopted its name in his "Bride of Abydos."

Also an ancient city of Upper Egypt, on the left bank of the Nile, supposed to have been the ancient This, and to have been second only to Thebes.



STATUES OF RAMESES II. IN FRONT OF THE TEMPLE OF ABU-SIMBEL
THESE FIGURES ARE SIXTY-FIVE FEET HIGH

in its interior repay the trouble of the ascent from Philæ. This most stupendous work of ancient Egyptian architecture was the creation of Ramses II. It was excavated out of the solid rock and dedicated at first to the leading deities of Egypt proper, Ammon of Thebes and Re-Harmakhis, but other deities were worshipped there as well. In 1892 the façade 119 feet broad and over 100 feet wide, was restored and two walls had to be built to protect it from the sand which blew into it from the west desert.

ABYSSINIA, a country of eastern Africa, bounded by the Sudan and Nubia on the W. and N., and by the Italian territory on the E.; area, about 350,000 square miles; formerly called Ethiopia. At present it includes the kingdoms of Tigré (with Lasta), Amhara, Gajam, and Shoa, besides several outlying dependencies.

The country consists of a huge tableland with a mean elevation of 7,000 feet, and crossed by high mountain ranges.

Topography.—The declivity to the bordering tract on the Red Sea is abrupt; toward the Nile basin it is more gradual. The main mass has been cut into a number of island-like sections by the streams, which have worn their channels into ravines of vast depth—as much sometimes as 4,000 feet. The principal are the head-streams of the Blue Nile, issuing from the great Lake Tzana, Tana, or Dembea, and the Atbara, also a tributary of the Nile; less important are the Mareb and the Hawash. Isolated mountains, with naked, perpendicular sides, present the most singular forms. The Samen mountains have summits rising to the height of 15,000 feet. The climate, notwithstanding its tropical position, is on the whole moderate and pleasant owing to its elevation, though in the river valleys and swamps the heat and moisture are suffocating and pestilential. As a whole, the country is exceedingly fruitful; and its productions are of the most varied nature, from the pines, heaths, and lichens of north Europe to the choicest tropical plants. Two, and in some places three, crops can be raised in one year.

Government.—The political institutions are feudal, like those of mediæval Europe. Education is confined to teaching carried out by the secular and regular clergy. Justice is administered by governors, landed proprietors, and petty chiefs. In addition to the local chiefs and their followers, the king maintains a permanent army called "Wotader," consisting of infantry, artillery, and cavalry, armed with rifles and numbering about 110,000 men.

Peoples.—The population numbers some 8,000,000 and consists of various elements, the chief being the Abyssinians proper—a brown, well-formed people belonging to the Semitic stock. The Abyssinians are composed of Ethiopians, Falashas, Gallas, etc. There are a multitude of dialects, but the prevailing language, called Amharic or Amharigna, is Semitic, with a mixture of African words. Cattle, sheep, and goats are largely raised. Indigo, cotton, coffee, and the sugar-cane are cultivated to some extent.

Religion.—This is a debased Christianity; but the Gallas and other alien tribes are mostly Mohammedan, and partly also pagan. The head of the church is a Copt, appointed by the Patriarch of Alexandria, as are also the bishops.

History.—Abyssinia is a part of what was anciently called Ethiopia; Ityopya is still the Abyssinian name of the country. The first king, according to the native tradition, was Menilehek or Menelek, the son of Solomon and the Queen of Sheba. The kingdom of Axum, named from the capital, was the nucleus of the state, and attained its greatest extent in the 6th century. The modern history of Abyssinia has been mainly struggles between the princes of various districts for supreme power. About 1850 an Amharic adventurer, Ras Ali, regent of Gondar, obtained dominion over successive provinces, and in 1855 had himself crowned, under the name of Theodore, as Negus. He conceived a violent hatred for Europeans, and, in November, 1864, he imprisoned the French and English political agents and several missionaries in the fortress of Magdala. Diplomatic efforts proving fruitless for their liberation, Lord Napier invaded the highlands and, in April, 1868, reached Magdala with 3,500 men. The king made a sortie, but was repulsed. Then, after a futile attempt to treat, he sent his prisoners to camp. On April 13, the British stormed the castle, but the king had meantime blown his brains out. In July, 1871, Kasa, King of Tigré, defeated his chief rival Gôbazê and was solemnly crowned as Negus, and took the name of Johannes II. He conquered Menelek and brought all the Abyssinian provinces under his scepter. In 1885 began the complications with Italy, owing to the murder of the traveler Bianchi. The Italian troops invaded the Abyssinian territory. In January, 1887, Ras Akula, supported by the Negus himself, fell upon the Italian outposts on the heights of Sahati, near Dogati. Only 82 wounded Italians escaped. Italy immediately sent a large force to regain the lost positions, and the Abyssinians withdrew. In the meantime the Mahdists invaded the country in the west, and Johannes, who went to resist them, was killed in the two days' battle near Metahemeh in Kalabat. King Menelek, of Shoa, who had been Johannes' secret ally, now seized the throne, and in the spring of 1890 was crowned Negus of Ethiopia, under the name of Menelek II., and concluded in the same year a treaty of mutual protection with Italy, which made Abyssinia to some extent an Italian protectorate. This, however, was repudiated by Menelek in 1893, and soon afterward difficulties with Italy arose which culminated in 1896 in a disastrous defeat of the Italian forces. By the convention of Adis Abeba, Oct. 26, 1896, the independence of Abyssinia was unreservedly recognized, and Abyssinia reserved to Italy the strip along the coast 180 miles broad. In 1898, Great Britain ceded to Abyssinia by treaty about 8,000 square miles of British Somaliland, and Menelek declared the Mahdists his enemies and pledged himself to do all he

could to prevent arms and ammunition reaching them through his territory.

Menelek died in December, 1913, and was succeeded by his grandson, Lij Yassu. On Sept. 27, 1916, the Emperor was deposed during his absence from the capital by a faction headed by the Metropolitan Abuna Mathaeos. Waizeru Zauditu, daughter of Menelek, was chosen as ruler in his stead. During the World War, Abyssinian troops were allied with the British in the East African campaign. On July 14, 1919, an Abyssinian delegation arrived in Washington and was received by President Wilson. They brought gifts and letters from the Empress and the Heir Apparent, Ras Taffari, congratulating America on the victorious outcome of the war.

ABYSSINIAN CHURCH, the name of a sect of the Christian Church established in Abyssinia. The forms and ritual of the Abyssinian Church are a strange compound of paganism, Judaism, and Christianity. It is governed by a bishop, who is styled abuna.

ACACIA, a genus of plants belonging to the *mimosæ*, one of the leading divisions of the great leguminous order of plants. They abound in Australia, in India, in Africa, tropical America and generally in the hotter regions of the world. Nearly 300 species are known from Australia alone. They are easily cultivated in greenhouses, where they flower, for the most part, in winter or early spring. The type is perhaps the *Acacia Arabica*, or gum arabic tree, common in India and Arabia. It looks very beautiful with its graceful, doubly pinnate leaves and its heads of flowers like little velvety pellets, of bright gamboge hue. Other species than the *A. Arabica* produce gum arabic. That of the shops is mostly derived from the *A. vera*, a stunted species growing in the Atlas mountains and other parts of Africa.

ACADEMICS, a name given to a series of philosophers who taught in the Athenian Academy, the scene of Plato's discourses.

ACADEMY, the gymnasium in the suburbs of Athens in which Plato taught, and so called after a hero, by name Academus, to whom it was said to have originally belonged. The word is also applied to a high school designed for the technical or other instruction of those who have already acquired the rudiments of knowledge; also a university.

Anciently, there were two public academies: one at Rome, founded by Adrian, in which all the sciences were taught, but especially jurisprudence; the other at Berytus, in Phœnicia, in which jurists were principally educated. Academy is the name, also, of a society or an association of artists, linked together for the promotion of art, or of scientific men, similarly united for the advancement of science, or of persons united for any more or less analogous object.

ACADEMY, FRENCH, an institution founded in 1635 by Cardinal Richelieu for the purpose of refining the French language and style. It became in time the most influential of all literary societies in Europe. Together with the Academy of Inscriptions and Belles Lettres, the Academy of Moral and Political Sciences and the Academy of Sciences, it composes the National Institute of France. It published in 1694 the first edition of a dictionary. The French Academy originated in a simple meeting of friends who met at the house of Conrart, one of their number. These reunions were held informally for many years. At last they attracted the attention of Richelieu, who, in 1634, proposed to form an Academy, and, from the 13th of March in that year, a record was kept of their transactions and a director or chancellor and a perpetual secretary were appointed. The Academy was definitely formed by letters patent of Louis XIII., in January, 1635; they were registered by Parliament July 10, 1637. At first the number was 30. Ordinary members receive 1,500 francs a year. In 1880 the discussion of the qualifications of candidates which had been in vogue for more than 10 years was abolished, but restored in 1896. In 1671 the sessions of the Academy became public. See INSTITUTE OF FRANCE.

ACADEMY OF ARTS AND LETTERS, AMERICAN, an organization established in 1898. The qualification for membership is notable achievement in arts, music, or literature. The membership is limited to 250. The first seven members were chosen in 1917. They were William Dean Howells, Augustus Saint Gaudens, Edmund Clarence Stedman, John La Farge, Samuel Langhorn Clemens, John Hay, and Edward A. MacDowell. The Academy holds annually a series of public meetings in different cities of the United States. William Dean Howells, until his death in 1920, was president of the Academy. Robert Underwood Johnson was permanent secretary.

In 1920 the membership list was as follows: John Singer Sargent, Daniel Chester French, John Burroughs, James Ford Rhodes, Horatio William Parker, Robert Underwood Johnson, George Washington Cable, Henry Van Dyke,

William Crary Brownell, Basil Lanneau Gildersleeve, Woodrow Wilson, Arthur Twining Hadley, Henry Cabot Lodge, Edwin Howland Blashfield, Thomas Hastings, Brander Matthews, Thomas Nelson Page, Elihu Vedder, George Edward Woodberry, George Whitefield Chadwick, Abbott Henderson Thayer, George de Forest Brush, William Rutherford Mead, Bliss Perry, Abbott Lawrence Lowell, Nicholas Murray Butler, Paul Wayland Bartlett, Owen Wister, Herbert Adams, Augustus Thomas, Timothy Cole, Cass Gilbert, William Roscoe Thayer, Robert Grant, Frederick MacMonnies, William Gillette, Paul Elmer More, Barrett Wendell, Gari Melchers, Elihu Root, Brand Whitlock, Hamlin Garland, Paul Shorey, Charles Platt, Maurice Francis Egan, Archer Huntington.

ACADEMY OF ARTS, THE ROYAL, a British institution for the encouragement of painting, sculpture, and designing; founded in 1768 by George III., with Sir Joshua Reynolds as president. It is composed of a president (P. R. A.), 40 academicians (R. A.), and 30 associates (A. R. A.), which include professors of painting, architecture, anatomy, and perspective.

ACADEMY OF DESIGN, NATIONAL, an American institution, in New York City, founded in 1826, conducting schools in various branches of the fine arts, and holding semiannual exhibitions at which prizes are awarded. The membership consists of academicians, who are the corporate body and use the title N. A. (National Academicians), and the associates, who use the title A. N. A.

ACADEMY OF FINE ARTS, THE, a French institution, originally founded in 1648 at Paris under the name of the Academy of Painting and Sculpture. In 1795 it was joined to the Academy of Architecture, and has borne its present name since 1819. See INSTITUTE OF FRANCE.

ACADEMY OF INSCRIPTIONS AND BELLES LETTRES, an institution founded at Paris by Colbert in 1663, under the name of Petite Académie. It was composed originally of four members, chosen by the ministry to belong to the Académie Française. In 1702 the Academy assumed its definitive form; 40 academicians were named. In 1803 the Academy was reconstituted and became the third class of the Institute. Comparative philology, Oriental, Greek, and Roman antiquities and epigraphy have received the attention of the Academy. See INSTITUTE OF FRANCE.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, an institution founded in 1812. It has one of the best natural history collections in the world—especially rich in stuffed birds—and a valuable scientific library. It has published "Journals" since 1817, and "Proceedings" since 1841.

ACADEMY OF POLITICAL AND SOCIAL SCIENCE, AMERICAN, an institution organized at Philadelphia in 1889 and incorporated in 1891. It has a large number of members and publishes bi-monthly "Annals."

ACADEMY OF SCIENCES, THE NATIONAL, an American institution, chartered by Congress in 1863, consisting of 150 members, elected from among the most distinguished scientific men of the United States; analogous to the Royal Society of London.

ACADIA, a former French colony in North America, including Nova Scotia and nearly all of New Brunswick, settled in 1604. When, by the peace of Utrecht (1713), it was given to the English, the inhabitants, having refused to take the oath of allegiance, were ordered to leave their homes. The story of their sorrow is touchingly introduced into Longfellow's "Evangeline."

ACANTHACEÆ, an order of monopetalous exogens, with two stamina; or, if there are four, then they are didynamous. The ovary is two-celled, with hard, often hooked, placentæ, and has from one or two to many seeds. There are often large, leafy bracts. The *acanthaceæ* are mostly tropical plants, many of them being Indian. They have both a resemblance and an affinity to the *Scrophulariaceæ* of this country, but are distinguishable at once by being prickly and spinous. In 1846 Lindley estimated the known species at 750, but it is believed that as many as 1,500 are now in herbariums. The acanthus, so well known in architectural sculpture, is the type of the order.

ACANTHITE, a silver sulphide classed by Dana under his chalcocite group. Composition AgS. It has about 86.71 of silver and 12.70 of sulphur. It is orthorhombic; the crystals are generally prisms with slender points.

ACANTHUS, the name of three ancient cities: (1) in Egypt, (2) in Caria, and (3) in Macedonia. The latter city is noted for the construction, across the neck of the peninsula of Mount Athos, of the great canal through which sailed the fleet of Xerxes on its way to Greece.

ACANTHUS, a genus of plants, the typical one of the order *acanthaceæ*, or acanthads. In English it is inelegantly termed bear's beech, or, more euphoniously, brank ursine. In architecture, it is the imitation, in the capitals of the Corinthian and Composite orders, of the leaves of a species of acanthus, the *A. spinosus*, which is found in Greece. The acanthus first copied is supposed to have been growing around a flower pot; and the merit of adopting the suggestion thus afforded for the ornamentation of the capital of a pillar is attributed to Callimachus.

ACAPULCO (ak-a-pōōl'kō), a seaport in Mexico on the Pacific Ocean; has a large and nearly land-locked harbor, but the climate is unwholesome. It exports hides, cedar timber, and fruit. Nearly the whole city was destroyed by earthquakes in 1799, in 1837, and again in 1852. Pop. about 7,500.

ACARNANIA, or **AKARNANIA**, a province of ancient Greece, forming the westernmost portion; named, according to tradition, from Acarnan, son of Alamæon, who settled the region. At the beginning of the Peloponnesian war the inhabitants were rude and piratical, and they always remained behind the other Greeks in civilization. They were good slingers and faithful and courageous soldiers. Under the Romans it was a province of Macedonia. It is now, with Ætolia, a province of the Grecian kingdom. Pop. about 150,000; capital Missolonghi.

ACCELERATION, in natural philosophy, the rate of increase of velocity of a moving body in a unit of time. If the acceleration is uniform, as in the case of a body falling or ascending under the action of gravity, the velocity is proportional to the time, and the space moved through varies as the square of the time. The acceleration of gravity is the increasing rate of motion with which a falling body approaches the earth, and is reckoned as a little more than 32 feet a second. Minus, or negative, acceleration is the corresponding loss of motion. In astronomy, the secular acceleration of the moon's mean motion is an increase of about 11 seconds per century in the rapidity of the moon's mean motion. It was discovered by Halley and explained by Laplace.

ACCENT, that stress or emphasis given by the voice to a certain syllable or syllables of a word, or to certain notes in a bar of music; also, the peculiar intonation of one spoken language when compared with another. The term further denotes marks used in printing or writing to show the position of the stress. There is a certain analogy between accent and emphasis, emphasis doing for whole words or clauses of sentences what accent does for single syllables. Marks sometimes called accents are used in mathematics, *e. g.*, $a' + b'$ (read *a* prime plus *b* prime). Accent in music is the greater intensity given to certain notes, as distinguished from their length in time and their quality or *timbre*. In geometry and trigonometry a circle at the right of a figure indicates degrees, one mark, minutes, two marks, seconds of a degree, as 13° 4′ 5″. In mensuration and engineering, the mark denotes feet, inches, and lines, as 4′ 6″ 10‴.

ACCEPTANCE, a bill of exchange drawn on one who agrees absolutely or conditionally to pay it, according to the tenor of the document itself. To render it so valid that, if the drawee fail to liquidate it, the drawer may be charged with costs, the promise of the drawer must be in writing under or upon the back of the bill.

ACCESSORY, in law, one who is not the chief actor in an offense nor present at its commission, but still is connected with it in some other way. Accessories may become so before the fact or after the fact. Sir Matthew Hale defines an accessory before the fact as one who, being absent at the time of the crime committed, does yet procure, counsel, or command another to commit a crime. If the procurer be present when the evil deed is being done, he is not an accessory, but a principal. An accessory after the fact is one who, knowing a felony to have been committed, receives, relieves, comforts, and assists the felon.

ACCIDENT, an unforeseen occurrence, particularly if it be of a calamitous character.

In logic: (a) Whatever does not really constitute an essential part of a person or thing; as the clothes one wears, the saddle on a horse, etc. (b) The qualities or attributes of a person or thing, as opposed to the substance. Thus bitterness, hardness, etc., are attributes, and not part of the substance in which they inhere. (c) That which may be absent from anything, leaving its essence still unimpaired.

Accidents, in logic, are of two kinds, separable and inseparable. If walking be the accident of a particular man, it is a separable one, for he would not cease to be that man though he stood still; while on the contrary, if Spaniard is the accident connected with him, it is an inseparable one, since he never can cease

to be, ethnologically considered, what he was born.

In grammar, a property attached to a word which nevertheless does not enter into its essential definition.

ACCIDENT INSURANCE, a form of insurance which pays persons a stated sum in compensation for bodily injury. Usually it is provided that insurance is made only against injuries caused by violent accidental or external means. It does not cover self-inflicted injury. There were in 1920 about fifty companies engaged in this form of insurance, although not all of these were limited to accident insurance. Losses paid for this form of insurance aggregate about $10,000,000 yearly.

ACCOLADE, in heraldry, the ceremony by which in mediæval times one was dubbed a knight. On the question what this was, antiquaries are not agreed. It has been made an embrace round the neck, a kiss, or a slight blow upon the cheek or shoulder.

ACCORDION, a well-known keyed instrument with metallic reeds. The sounds are produced by the vibration of the several metallic tongues, which are of different sizes, air being meanwhile supplied by the movement of the opposite sides of the instrument, so as to constitute a bellows. The accordion was introduced into America from Germany about 1828.

ACCOUNT, in banking, commerce, law, and ordinary language, a registry of pecuniary transactions; such a record as is kept by merchants, by housewives, and by all prudent people, with the view of, day by day, ascertaining their financial position. A bill or paper sent in by tradespeople to those who do not pay for goods on delivery.

An open account, or an account current, is, commercially, one in which the balance has not been struck; in banking, it is one which may be added to or drawn upon at any time, as opposed to a deposit account, where notice is required for withdrawals.

ACCOUNTING, a profession which has grown out of the increased complexity of keeping and adjusting business transactions. It is concerned chiefly with the problem of classification of uncertain items in the course of business and with the problems of valuation. The skilled accountant must have a wide knowledge of business in general and a special knowledge of the field in which he is engaged. In recent years the principles of accounting have been increasingly applied to the control of production. This is known as cost accounting. The department of accounting has become an important one in recent years in nearly all schools and colleges which have a business department. There are also many schools which give instruction only in accounting. Chartered accountants are able to command a high rate of pay for their services.

ACCUMULATOR. See STORAGE BATTERY.

ACER, a genus of arborescent or shrubby plants, order *acerineæ*, many of which are extremely valuable for the sake either of their timber, or of their ornamental appearance. The *acer rubrum*, or red maple, is a tree 50 feet in height, very common in low woods throughout the Atlantic States. The wood, particularly that of the variety called curled maple, is much used in cabinet work. The *acer saccharinum*, or sugar tree, is a tree 70 feet in height, 3 feet in diameter, found throughout the United States, and constituting the greater part of some of the forests of New England. The wood is hard and has a satin luster, but it is readily attacked by insects, and is not of much value, except when its grain is accidentally waved, and then it is in request for the cabinet-makers. The saccharine matter contained in its ascending sap, obtained by tapping the trunk in the spring, is perhaps the most delicious of all sweets; an ordinary tree yields from 5 to 10 pounds in a season.

ACETANILID, more commonly known as anti-febrin. Formula $C_6H_5NHCOCH_3$. Its melting point is 237° F. It boils at 563° F. It dissolves in alcohol, ether, and hot water, less readily in cold water. Its principal use in medicine is as a sedative and febrifuge, but it should be used with great caution unless prescribed by a physician.

ACETIC ACID, the acid which imparts sourness to vinegar, vinegar being simply acetic acid diluted, tinged with color and slightly mingled with other impurities. The formula of acetic acid is

$$C_2H_3O(OH), \text{ or } \left.\begin{matrix}CH_3\\HO.CO\end{matrix}\right\}, \text{ or } \left.\begin{matrix}C_2H_3O\\H\end{matrix}\right\}O$$

=methyl-formic acid. It is formed by the acetous fermentation of alcohol. Acetic acid is a monatomic monobasic acid. Its salts are called acetates. A molecule of acetic acid can also unite with normal acetates like water of crystallization. Its principal salts are those of potassium, sodium, and ammonium, a solution of which is called spiritus mindereri. The acetates of barium and calcium are very

soluble. Aluminum acetate is used in dyeing. Lead acetate is called sugar of lead, from its sweet taste. It dissolves in 1½ parts of cold water; it also dissolves oxide of lead, forming a basic acetate of lead. Basic cupric acetate is called verdigris. Acetic acid below 15.5° forms colorless transparent crystals (glacial acetic acid), which melt into a thin, colorless, pungent, strongly acid liquid, soluble in alcohol, ether, and water. It boils at 118°. Its vapor is inflammable.

Pyroligneous acid is impure acetic acid, formed by the destructive distillation, at red heat, of dry hard wood, as oak and beech.

ACETIC ETHERS [example, ethyl acetate,

$$\left.\begin{matrix} C_2H_3O \\ C_2H_5 \end{matrix}\right\} O]$$

are formed by replacing the typical H in acetic acid by a radical of an alcohol, as ethyl, etc. Ethyl acetate is a fragrant liquid, sp. gr. 0.890, boils at 74°; methyl acetate boils at 56°.

ACETONES, or **KETONES**, are the aldehydes of secondary alcohols (see ALCOHOL). Thus secondary propyl alcohol, when oxidized, loses two atoms of hydrogen, and gives dimethyl ketone, ordinarily known as acetone.

Secondary Propyl Alcohol. Acetone.

$$CH_3—CHOH—CH_3—H_2=CH_3—CO—CH_3.$$

A series of such acetones is known, of which acetone is typical. It may be prepared by distilling acetate of calcium. It is a limpid liquid, having a taste like that of peppermint, and is readily soluble in alcohol, ether, and water. Its sp. gr. is about .79, its boiling point being 130° F. (56° C.). It has recently been used in America for the manufacture of chloroform, which is obtained from it by distillation with bleaching-powder. It is a solvent for gums and resins, as well as for gun-cotton.

ACETYLENE, a hydrocarbon having the formula C_2H_2, also called ethine. The carbon atoms are united to each other by three bonds. It is produced by passing an electric current between carbon poles in an atmosphere of hydrogen, and also by the incomplete combustion of hydrocarbons. It is a colorless gas, specific gravity, 0.92, has a peculiar odor, and burns with a bright flame; it forms a red precipitate with ammoniacal cuprous chloride, which, by the action of nascent hydrogen, is converted into ethylene, C_2H_4.

ACETYLENE GAS, an illuminating gas formed by the action of water on CALCIUM CARBIDE (*q. v.*). This gas has come into general favor with cyclists for its brilliancy, safety, and the persistence of its flame in all circumstances. Recent experiments made to produce cheaper calcium carbide, by a new process, resulted in demonstrating that it can be produced at a cost of from half a cent to three cents a pound, or one-fifth its original cost. This will bring acetylene gas within the reach of every one, and it will probably eventually supersede many other forms of lighting. One kilogram of calcium carbide produces about 300 litres of acetylene gas. Acetylene takes fire at 480° Cent.; at 700° it decomposes into carbonic acid and hydrogen.

ACETYLENE LAMP, a lamp designed for utilizing acetylene as an illuminant. Acetylene lamps have come into general use among cyclists. In some of the lamps, cartridges filled with calcium carbide are used, and the dropping of the water into the cartridge is regulated by an adjustable valve. The acetylene flame is very brilliant.

ACHÆA, a Greek province. See ACHAIA.

ACHÆANS, a generic term employed by Homer to designate the whole Hellenic host before Troy, from their mythological ancestor, Achæus, grandson of Helen.

ACHÆI (ak-ā-ē, or ak-ī′ē), the descendants of Achæus, the son of Zuthus, and grandson of Helen. Achæus, having committed manslaughter, was compelled to take refuge in Laconia, where he died, and where his posterity remained under the name of Achæi, until they were expelled by the Heraclidæ. Upon this, they passed into the northern parts of Peloponnesus, and, under the command of Tisamenus, the son of Orestes, took possession of the country of the Ionians, and called it Achaia. The successors of Tisamenus ruled until the time of Gyges' tyranny, when Achaia was parceled into 12 small republics. Three of these—Patræ, Dymæ, and Pharæ—became famous as a confederacy, 284 B. C., under the name of the Achæan League. At last, however, they were attacked by the Romans, and, after one year's hostilities, the Achæan League was totally destroyed, B. C. 147.

ACHAIA, a small Greek district lying along the N. coast of the Peloponnesus. Achaia forms, along with Elis, a department in the modern kingdom, and its chief town is Patras. As the Achaians (Achæans) were the ruling people of the Peloponnesus in heroic times, Homer speaks of the Greeks generally as Ach-

aioi. Their 12 little towns formed a confederacy, renewed in 281 B. C., and subsequently extended, under the name of the Achæan League, throughout Greece, until 146 B. C., when Greece fell under the power of Rome. Pop. 225,000.

ACHARD, LOUIS AMÉDÉE (ä-shär'), a French novelist and publicist, born in 1814. Originally a merchant, he became a contributor to several papers in Paris in 1838. After the revolution of 1848 he was for a time active as a political writer in support of the royalist cause. He depicts pre-eminently conflicts in family life and society. He died in 1875.

ACHATES, a friend of Æneas, whose fidelity was so exemplary that *fidus Achates* (the faithful Achates) became a proverb.

ACHERON, the river of sorrow, which flowed round the infernal realms of Hades, according to the mythology of the ancients.

ACHESON, EDWARD GOODRICH, an American inventor, born in Washington, Pa., in 1856. He received an academic education and for a short time acted as assistant of Thomas A. Edison. He invented carborundum, silicon, and several methods of making graphite. He has received medals from many American and foreign scientific societies, and has been president of the American Chemical Society and an officer and member of many other chemical societies.

ACHILLES (ak-il'ēz), son of Peleus, king of the Myrmidons, in Thessaly, and of Thetis, daughter of Nereus. He joined the Grecian army, in which he was pre-eminent in valor, strength, swiftness, and beauty. Before Troy a quarrel broke out between him and the general-in-chief, Agamemnon, which led him to withdraw entirely from the contest. In consequence, the Trojans reduced the Greeks to extreme distress. The Greek council of war now sent its most influential members to soothe the anger of Achilles, and to induce him to return to arms, but without effect. Rage and grief, caused by the death of his friend Patroclus, slain by Hector, induced Achilles to return to battle. At the close of a day of slaughter he killed Hector, and dragged him at his chariot wheels to the camp. Here ends the history of Achilles, so far as it is derived from Homer. By later authors, a variety of fable is mixed up with this simple narrative. Thetis is said to have dipped him, while an infant, in the Styx, which rendered him invulnerable except in the heel by which she held him, and he was killed at last by a wound in the heel.

ACHILLES TENDON, a tendon, so called because, as fable reports, Thetis, the mother of Achilles, held him by that part when she dipped him in the river Styx to make him invulnerable. It is the strong and powerful tendon of the heel, which is formed by the junction of divers muscles, and which extends from the calf to the heel. When this tendon is cut or ruptured, the use of the leg is immediately lost; and, unless the parts be afterward successfully united, the patient will remain a cripple for life.

ACHMET TEWFIK PASHA, a Turkish statesman, born in 1818 at Constantinople. His father was a Greek convert; his mother was a Jewess. He was educated at Paris. He was appointed commander for the Porte, and displayed great diplomatic talent, and was sent, in 1851, as Ambassador to Persia. On his return he became a member of the state council and of the military council. He was regarded as one of the leaders in the Turkish reform party. In 1860 and 1861 he was Ambassador to Paris. He translated Molière into Turkish, and wrote a geographical text-book for schools. In 1877 the Sultan appointed him President of the first Turkish Chamber of Deputies. In 1878 he was Premier and signed the Peace of Santo Stefano. He died in June, 1891.

ACHROMATIC. See TELESCOPE.

ACI (ä'chē), or **ACI REALE**, a seaport town in Sicily, province of Catania, well built with lava, having a castle and many fine edifices. It has manufactories of silks, linens, cutlery, and filigree work. Pop. about 37,000.

ACIDS, in chemistry, a salt of hydrogen in which the hydrogen can be replaced by a metal, or can, with a basic metallic oxide, form a salt of that metal and water. Acid oxides of the same element are distinguished by the termination of *-ous* and *-ic*—as sulphurous and sulphuric—the latter containing the most oxygen; they are also called anhydrides. They unite with water and form acids having the same terminations. By replacement of the hydrogen by a metal they form salts distinguished by the terminations *-ite* and *-ate* respectively. These acids are called oxygen acids. Many acids are formed by direct union of hydrogen with an element, as hydrochloric acid (HCl), hydrosulphuric acid (H_2S), or with an organic radical, as hydrocyanic acid, H(CN). Acids which are soluble in water redden blue litmus, and have a sour taste. Organic acids can be produced by the oxidation of an alcohol or aldehyde. They contain the monad

radical (HO·OC), once if they are monobasic, twice if dibasic, etc. They are also classed as monatomic, diatomic, etc., according as they are derived from a monatomic or diatomic alcohol, etc. Many organic acids occur in the juices of vegetables, some in animals, as formic acid in ants.

ACLAND, SIR HENRY WENTWORTH DYKE, an English sanitarian, born in 1815. He was an expert on cholera and the various forms of plague. From 1857 to 1894 he was Professor of Medicine at Oxford, besides serving on various sanitary bodies. He was author of "Memoirs of the Cholera," etc. He died Oct. 16, 1900.

ACNE, a genus of skin diseases containing those characterized by pustules, which, after suppurating imperfectly, become small, hard, red, circumscribed tubercles on the skin, resolving themselves but slowly. Among the leading species of the genus are (1) the *A. simplex*, consisting of small *vari*, which break out on the face, the shoulders, and the upper part of the back; (2) *A. follicularis*, or maggot-pimple; (3) the *A. indurata*, or stone-pock; and (4) the *A. resaceæ*, or carbuncle face.

ACOLYTE, in the Roman Catholic Church, one of the inferior orders of the clergy, whose office it is to attend upon the deacons and subdeacons in the ministry of the altar, to light and hold the candles, to bear the incense, to present the priest with wine and water, etc. In the primitive Church, the acolytes were in holy orders, and ranked next to the subdeacons; but, at the present time, the duties of the acolyte are very often performed by laymen and chorister boys.

ACONCAGUA, a province of the republic of Chile, bounded N. and W. by the province of Quillota, E. by the Andes, and S. by Santiago. Area, 5,406 square miles. The mountain Aconcagua is the loftiest of the Andes, being 23,910 feet above the level of the sea. Productions are maize, wheat, beans, pumpkins, melons, and other garden produce; vineyards and orchards are plentiful, and in summer numerous flocks are pastured on the slopes of the Andes. Gold is found and copper is worked in mines. Pop. about 130,000. Chief town San Felipe. On the S. side of the mountain Aconcagua rises a river of the same name.

ACONITE, a plant of the genus *aconitum*, the *aconitum napellus*, familiarly known as the monk's-hood, or wolf's-bane. Its active principle, the aconitine, is a virulent poison. It is a native of Europe, and is cultivated as a garden plant for the sake of its handsome purple flowers.

ACONITINE, or ACONITIA, a powerful vegetable alkaloid, prepared from the root of the *aconitum napellus* (aconite). It is one of the most virulent of poisons, but, at the same time, a very valuable medicine. An ointment containing aconitine is often used in cases of neuralgia, acute rheumatism, and diseases of the heart. Its narcotic action is so active that a fiftieth of a grain may endanger the life of an adult. The most effectual antidote in case of poisoning is warm water, administered till it produces vomiting, after which stimulant remedies should be applied internally and externally.

ACORN, the well known fruit of the oak. In the early ages, acorns constituted a principal part of the food of man. (Ovid's "Metamorphosis," i, 106; Vergil's "Georgics," i, 8.) At present they are used for the feeding of pigs, etc.

ACORN SHELL, the popular name for the *balanus* and other cirripeds, which inhabit a tubular shell whose base is usually formed of calcareous laminæ. Its shell is composed of many pieces, and thus capable of enlargement to the wants of the inclosed animal. These curious, but common, shells are found in all seas. They are affixed to marine bodies, and their peduncle is sometimes found a foot long.

ACORUS, a genus of plants, order *orontiaceæ*. The *acorus calamus*, or sweet flag, a member of this genus, is the only native aromatic plant of northern climates. It blossoms during the months of May and June.

ACOUSTICS. See SOUND.

ACQUI (ak'wē), a district of north Italy, province of Alessandria, on the N. side of the Ligurian Apennines. Area, 445 square miles. Productions, corn and fruit. Silk worms are reared as a branch of industry.

Acqui, its capital on the Bormida, 18 miles S. S. W. of Alessandria. It has commodious sulphur baths. Pop. about 18,000.

ACRE, (1) Originally, any field, whatever its superficial area.

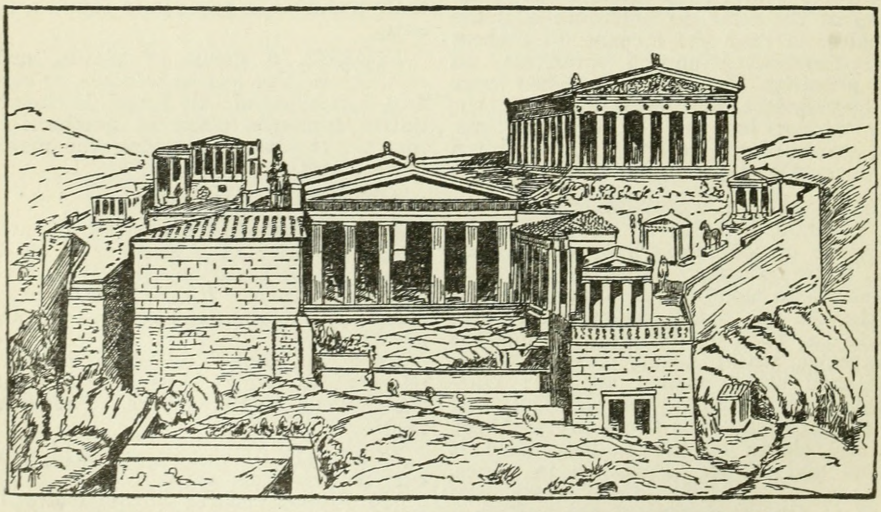
(2) From about the time of Edward I. the word became more definite, and its limits were prescribed by the Statutes 31 and 35 Edward I., and 24 Henry VIII. By the Act 5 George IV., the varying measures of the acre current in the kingdom were reduced to one uniform standard. The imperial acre contains

4,840 square yards, the Scottish one, 6,104.12789 square yards, and the Irish one, 7,840 square yards. The imperial acre is current in the United States. The old Roman *jugerum*, generally translated acre, was about five-eighths of the imperial acre.

ACRE (ä'kr), or **ST. JEAN D'ACRE**, a seaport of Syria, formerly called Ptolemais; on a promontory at the foot of Mount Carmel. It was taken by the first crusaders in 1104, retaken by the Saracens in 1187, recovered by the Christians under Richard Cœur de Lion, in 1191, and given to the Knights of St. John of Jerusalem. In 1291 it again fell into the hands of the Saracens. Bonaparte attempted to storm this place in 1799, but retreated after a siege of 61 days. It was taken by Ibrahim Pasha, in 1832, and again by the combined English and Austrian squadrons, in 1840.

ACROCORINTHUS, a steep and lofty mountain, shaped as a truncated cone, overhanging the city of Corinth, 1,885 feet in height, on which was built a citadel.

ACROPOLIS, the high part of any ancient Greek city, usually an eminence overlooking the city, and frequently its citadel. Notable among such citadels were the Acropolis of Argos, that of Messene, of Thebes, and of Corinth, but pre-eminently the Acropolis of Athens, to which the name is now chiefly applied. The Acropolis of Athens was the original city of Athens, later the upper city, as distinguished from the lower, and was built upon a separate spur or butte of Hymettus. The hill rises out of the plain, a mass of rock about 260 feet high. The summit of this rock forms an uneven plain 500 by 1,150 feet at the maximum breadth and length. Within this area were reared, chiefly in the days of Pericles, remarkable specimens of architectural art. The buildings were grouped around two principal temples, the Parthenon and the Erechtheum. Between these temples stood the statue of Athena Promachos (fighter in front), by Phidias, the helmet and spear of which were the first objects visible from the sea. About these center pieces were lesser temples, statues, theaters, fanes, and odea (music halls). Among the famous buildings on the sides of the Acropolis were the Dionysiac theater and the Odeum of Pericles, and the Odeum, built by Herodes Atticus in honor of his wife, Regilla. The ravages of accident and war and Athenian marble-merchants have largely destroyed and despoiled these classic works. See ATHENS.



THE ACROPOLIS AT ATHENS, AS IT WAS IN THE TIME OF PERICLES

ACROSTIC, a poetical composition, disposed in such a manner that the initial letters of each line, taken in order, form a person's name or other complete word or words. This kind of poetical triflings was very popular with the French poets from the time of Francis I. until Louis XIV.

In the Old Testament there are 12 psalms written according to this principle. Of these, the 119th Psalm is the most remarkable; it consists of 22 stanzas, each of which commences with a Hebrew letter,

and is called by its name. Acrostic verse is no longer cultivated by the poets. Edgar Allan Poe wrote some striking acrostics, varying the form with great ingenuity.

ACT, in dramatic language, a portion of a play performed continuously, after which the representation is suspended for a little. As early as the time of Horace there were five acts in a drama, but this number is frequently modified on the modern stage.

In parliamentary language, an act of congress, legislature, etc.

In law: (1) Anything officially done by the court, as the phrases "Acts of Court," "Acts of Sederunt," etc. (2) An instrument in writing for declaring or proving the truth of anything.

ACT OF SETTLEMENT, an act of the Parliament of England in 1701, vesting the hereditary right to the English throne in Sophia, Electress of Hanover, and her Protestant descendants, constituting the source of the sovereignty of the house of Hanover or Brunswick, the present ruling line. The act prohibited the king (or queen) from going to war in defense of non-English powers without the assent of Parliament.

ACTA SANCTORUM, or MARTYRUM, the collective title given to several old writings, respecting saints and martyrs in the Greek and Roman Catholic Churches, but now applied especially to one extensive collection begun by the Jesuits in the 17th century. Commenced by the Jesuit Rosweyd, continued by J. Bolland, the work was carried on after the latter's death by a society of learned Jesuits, who were styled Bollandists until 1794. In recent times, the undertaking has been resumed, until over 60 volumes have been published.

ACTÆA, a genus of plants belonging to the order *ranunculaceæ*, or crowfoots. One species, the *A. spicata* = the bane-berry, or herb-christopher, is indigenous to many lands. It bears black berries, which are poisonous. With alum, they yield a black dye. The roots are antispasmodic, expectorant, and astringent. *A. racemosa*, the snakeroot, receives its English name from being used in the United States as an antidote against the bite of the rattlesnake.

ACTINIA, in zoölogy, a genus of polyps with many arms radiating from around their mouth, in a manner somewhat resembling the rays of the sun surrounding his disc, or a double flower. From this arrangement of the tentacles, coupled with the bright colors of these animals, they are called also animal flowers. Though simple and not aggregated, they still have a somewhat close affinity to the coral-building polyps.

ACTINOGRAPH, an instrument for recording the variations of chemical influence of the solar rays and of other radiations.

ACTINOLITE (Greek *aktis*, genit. *aktinos*=a ray, and *lithos*=a stone. The translation of the German *strahlstein*= radiated stone), a variety of amphibole. It is the actinote of Haüy. Its affinity and composition are indicated by Dara's compound name for it—magnesia-lime-iron amphibole. It is bright green, or grayish-green, the green color being imparted by the iron it contains.

ACTINOMETER, an instrument for measuring the chemical effects of radiation from any source, especially the sun.

ACTINOMYCOSIS, the name now given to a disease long known to occur in cattle, but confounded with tubercle or sarcoma. In 1877, Bollinger, of Munich, showed that little yellow grains are always present, consisting of a minute fungus, with its mycelium arranged in a radiate manner. To this fungus he gave the name actinomyces; and further observation has confirmed his view that it is the cause of the disease. Actinomycosis is most common in cattle; occurs also in pigs, and (rarely) in man.

ACTINOTHERAPY, the method of treating diseases by chemical or actinic rays. See PHOTOTHERAPY.

ACTINOZOA, a class of animals included in the radiata of the system of Cuvier, but combined with hydrozoa to form the class coelenterata in the systems of Frey, Leuckart, and Huxley. It contains the sea-anemones and coral polyps.

ACTION, in law, a judicial proceeding before a court of justice to secure redress for the infringement of a right. In courts of equity a corresponding proceeding is termed a suit. Actions are classified as civil and criminal. Civil actions are instituted to enforce a private right or to obtain redress for a private wrong. Civil actions are personal, when claiming recovery of personal property or damages in lieu thereof; real, when concerning the recovery of land, rents, etc.; or mixed, when partaking of the character of both. Criminal actions are brought by the state against some person accused of having committed a crime. Statutory actions are based on statutes, while common-law actions are enforced without the aid of a statute.

ACTIUM, a town and promontory of Epirus, famous for the naval victory which Augustus obtained over Antony and Cleopatra, the 2d of September, B. C. 31, in honor of which the conqueror built there the town of Nicopolis, and restored the Actian games instituted in honor of Apollo.

ACTON, JOHN EMERICH EDWARD DALBERG, 1st BARON, an English historian, born in 1834 in Naples. He was educated at the University of Munich and he devoted himself to the study of French, German, and Italian literature and history. After extensive travels in America, France, and other European countries, he returned to England and served in Parliament for six years. Acton was a Roman Catholic and was one of the most prominent laymen of that church. He succeeded Cardinal Newman as editor of the "Rambler," and in this capacity wrote hundreds of book reviews and other articles. He also edited other publications. His chief work, however, was the study and writing of history. In 1895 he became regius professor of modern history at Cambridge University and served in that chair until his death. During this period he planned and carried out the "Cambridge Modern History," securing the assistance of prominent historians in Europe and America. His published writings include "The History of Freedom and Other Essays" (1907); "Historical Essays and Studies" (1907). After his death "Lectures in Modern History" was published. He died in 1902.

ACTORS' CHURCH ALLIANCE OF AMERICA, an organization formed in 1899 by Walter E. Bentley, an actor who had formerly been a clergyman. Its object was to foster a better understanding between the stage and the church, to urge that no theatrical performances be given on Sunday, and to promote the welfare of actors. It is affiliated with a British organization of similar aims and has had a steady growth. Its membership is over 5,000, and it has at its call 1,500 chaplains in more than 400 cities of America.

ACTS OF THE APOSTLES, the fifth book of the New Testament. It contains narrative of the achievements of the leading apostles and especially of St. Paul. Its author was St. Luke, who was Paul's companion from the time of his visit to Troas to the advanced period of his life when he penned the second epistle to Timothy. Internal evidence would seem to show that it was written in all probability about A. D. 61. The undesigned coincidences between the Acts of the Apostles and the Epistles of Paul are numerous and important.

ACTUARY, in civil law, a registrar or clerk of a court; also an officer of a mercantile or insurance company, skilled in financial calculations, specially on such subjects as the expectancy of life. He is generally manager of the company, under the nominal or real superintendence of a board of directors.

ADA, a city of Oklahoma, the county-seat of Pontotoc co. It is on the St. Louis and San Francisco, the Missouri, Kansas, and Texas, and the Oklahoma Central railroads. Its most important industries are the manufacture of cement and asphalt and the growing of cotton. It is the center of an important agricultural and mineral-producing region and is the seat of the State normal school. Pop. (1910) 4,349; (1920) 8,012.

ADAGIO (ad-äzh'ē-ō), a slow or very slow movement or measure of time in music. The distinctive feature of the adagio being its power of expression, it affords the most direct means to the composer of manifesting his individuality of feeling. The finest specimens of the adagio are found in the works of the old masters, above all in Beethoven.

ADALBERT, ST., the apostle of the Prussians, was a native of Prague, and was chosen its bishop in 982. His austerity irritated the lawless and but recently converted Bohemians, and he was obliged to flee from his diocese. He afterward preached without much success to the heathen Poles and Prussians, and was murdered by the latter, April 23, 997. His body was buried in the cathedral at Gnesen, and afterward carried to Prague.

ADAM and EVE, the names of the first pair of human beings in the account of the creation given in the book of Genesis. Adam is strictly a generic name, applicable to both man and woman, as used in the book of Genesis, but it came to be a proper name, used with the article, as in chapters ii, iii, and iv. The orgin of the name is uncertain, but is usually connected with the Hebrew root *Adam*, "to be red." It is often derived from *Adamah*, "the ground," but this is taking the simpler from the more developed form. The Assyrian equivalent is *Adamu*, "man," used only in a general sense, not as a proper name. This is connected by Sir Henry Rawlinson and Professor Sayce with *Adamatu*, "red skins," the Assyrian word by which the dark-skinned Accadians of primitive Babylonia are designated in the bilingual

tablets. Eve is the Hebrew *Havvah*, which name, according to Gen. iii: 20, Adam gave her as the "mother of all living." Literally, the word means "life."

The early part of Genesis contains two somewhat different accounts of the creation of Adam. In the earlier account (i: 26-30), the creation of man and woman is given after the creation of the animals; in the second account (chapter ii), the creation of Adam is mentioned before that of the animals, and the forming of Eve afterward. The first narrator is commonly called the Elohistic, from his use of the name Elohim for God; the second, the Jehovistic, from his using the name Jehovah Elohim. The Elohistic narrator simply states that God created man in His own image. Man is created at the close of the six days' work as the lord of the whole lower world, for whom all things are made. The Jehovistic narrator gives a detailed account of Paradise, the original sin of Adam and Eve, their subjection to the curse, and expulsion from Eden. It is, in Ewald's phrase, the history proper of the creation of man. The first condition of Adam and Eve is one of innocent simplicity. They are placed in Eden, where they are allowed to taste freely of the fruit of every tree save one. Temptation comes from without, through the serpent's persuading Eve that the divine prohibition is really intended to keep human beings from becoming as wise as God. Eve yields to the temptation, and leads Adam also into her sin; and thus the moral consciousness of man awoke, and spiritual death passed upon mankind. Adam and Eve are then driven out of Paradise, and prevented, by the cherubim and a flaming sword which turned every way, from returning "to take also of the tree of life, and eat, and live forever." Adam lives 930 years; has three sons, Cain, Abel, and Seth, then sons and daughters.

Such is the form of the story which has usually been interpreted by orthodox Jews and Christians as a narrative of literal history, notwithstanding many difficulties about the anthropomorphic details, and the admitted uncertainty of the point where the literal ends and the figurative begins. Many of the later Jews explained the story as an allegory. Philo, the foremost writer of the Alexandrian school, explains Eve as the sensuous part, Adam as the rational part, of human nature. The serpent attacks the sensuous element, which yields to the temptation of pleasure, and next enslaves the reason. Clement and Origen adapted this interpretation somewhat awkwardly to Christian theology. Augustine explained the story as history, but admitted a spiritual meaning superinduced upon the literal; and his explanation was adopted by the reformers, and, indeed, generally, by the orthodox within the Romish and the various Protestant churches alike. More modern critics have sought to separate the kernel of history from the poetical accretions, and attribute the real value of the story, not to its form, but to the underlying thoughts. Martensen describes it as a combination of history and sacred symbolism, "figurative presentation of an actual event." The narrative may be regarded as embodying the philosophy of the Hebrew mind applied to the everlasting problem of the origin of sin and suffering; a question the solution of which is scarcely nearer us now than it was to the primitive Hebrews.

The story of Adam has been a rich subject both in literature and art. It was frequently treated by the medieval painters, and formed the material of many mysteries and other poems. Of more modern works, it is enough to mention the splendid epic of Milton, "Paradise Lost." Here Adam and Eve are the archetypal man and woman, sketched with outlines that can only be compared for grand simplicity with Michael Angelo's two frescoes in the Sistine Chapel, of Adam and Eve coming into life.

ADAM, PAUL, a French writer, born in 1862. He took part in politics and was defeated for election to the Chamber of Deputies. He began to write in 1885. His first work showed the influence of Zola; his later writings, however, turned to the romantic and symbolistic school. His work included "Red Robes" (1891); "Child of Austerlitz" (1902); "The Sun of July" (1903); "Stephanie" (1913). He also wrote and collaborated in the writing of several plays.

ADAM'S BRIDGE or **RA-MA'S BRIDGE**, a chain of shoals across the Gulf of Manaar, between Hindustan and the island of Ceylon.

ADAM'S PEAK, a mountain in the S. of the island of Ceylon. It is a resort of Moslem and Buddhist pilgrims. Height, 7,420 feet. The native name is Samanella. The cone forming the summit is a naked mass of granite, terminating in a narrow platform, in the middle of which is a hollow, 5 feet long, having a resemblance to a human footstep. Mohammedan tradition makes this the scene of Adam's penitence, after his expulsion from Paradise; he stood 1,000 years on one foot weeping for his sin; hence the mark. To the Buddhists, the

impression is the *Sri-pada*, or sacred footmark, left by Buddha on his departure from Ceylon; and the Hindus have the same tradition in respect to Siva.

ADAMS, a town of Massachusetts in Berkshire co. which includes three villages. It is about 16 miles N. of Pittsfield and is on the Boston and Albany railroad and on the Hoosic river. Mount Greylock, the highest elevation in Massachusetts, is within the town limits. There is a public library, many churches, a statue of William McKinley and a Quaker meeting house. The town has manufactories of cotton and woolen goods, and paper and lime products. Pop. (1910) 13,026; (1920) 12,967.

ADAMS, BROOKS, an American lawyer and writer; born in Quincy, Mass., in 1848. He was the son of Charles Francis Adams, and a brother of Henry and Charles Francis Adams. After graduating from Harvard in 1870, he was admitted to the bar and practiced law until 1881. His chief interest, however, was the writing of essays on economic subjects. His works include "Law of Civilization and Decay," and "America's Economic Supremacy" (1900); "The New Empire" (1902); "Economics and Public Affairs" (1913); "The Theory of Social Revolution" (1913), etc.

ADAMS, CHARLES FOLLEN, an American dialect poet; born at Dorchester, Mass., April 21, 1842; author of "Leedle Yawcob Strauss, and Other Poems" (1878); "Dialect Ballads" (1887), etc.

ADAMS, CHARLES FRANCIS, an American statesman; born in Boston, Aug. 18, 1807; was candidate for Vice-President in 1848, twice elected to Congress, was Minister to England from 1861 to 1868, and member of the Geneva Arbitration Commission of 1871. His chief literary work was "Life and Works of John Adams" (10 vols., 1850-1856), his grandfather. He also edited the writings of his father, John Quincy Adams. He died in Boston, Nov. 21, 1886.

ADAMS, CHARLES FRANCIS, an American publicist and lawyer, son of the preceding; born in Boston, May 27, 1835. He served in the Union army during the Civil War. Besides notable articles in the "North American Review," on railroad management, he has published "Chapters of Erie" (1871); "Three Episodes of Massachusetts History" (1892); "Essays on Educational Topics" (1879), and a biography of his father (1900). For several years he was President of the Union Pacific railway. Died at Washington, D. C., March 20, 1915.

ADAMS, CHARLES KENDALL, an American historian and educator; born at Derby, Vt., Jan. 24, 1835. He became President of Cornell University (1885), of the American Historical Association (1890), of the University of Wisconsisn (1892), and editor-in-chief of "Johnson's Universal Cyclopædia" (1892). He died July 26, 1902.

ADAMS, FRANKLIN PIERCE, an American humorous writer; born in Chicago in 1881. He graduated from the Armour Scientific Academy in 1899 and for one year after attended the University of Michigan. Beginning newspaper work on the Chicago "Journal," he was successively editor of the New York "Evening Mail" and New York "Tribune." In the two latter papers he conducted a daily humorous column which was widely read. His published works include "In Other Worlds" (1912); "By and Large" (1914); "Weights and Measures" (1917).

ADAMS, GEORGE BURTON, an American educator; born in Fairfield, Vt., in 1851. He graduated from Beloit College in 1873 and carried on post-graduate studies in Germany. He was professor of history in Drury College from 1877 to 1888. In the latter year he was appointed to the same chair in Yale University. From 1895 to 1910 he was editor of the "Historical Review." He edited many important books and documents dealing with the history of the Middle Ages, and was the author of "Civilization During the Middle Ages"; "The Growth of the French Nation"; "The Origin of the English Constitution," etc. He also wrote articles and delivered many addresses on historical subjects.

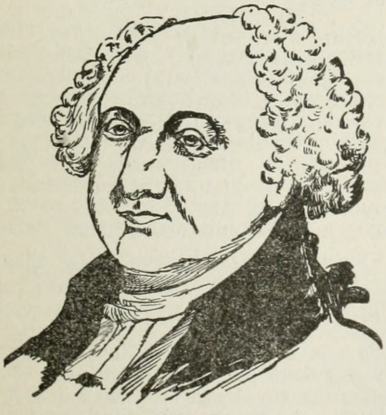
ADAMS, HENRY, an American historian; born in Boston, Mass., Feb. 16, 1838; grandson of J. Q. Adams. He was for some time editor of the "North American Review," and Professor of History in Harvard College. He wrote "The Life of Albert Gallatin" (1879); "John Randolph" (1882), etc. His principal work is the "History of the United States from 1801 to 1817," which constitutes an authoritative history of that period. An autobiography, at first printed for private circulation only, was brought out for general circulation in 1919 as "The Education of Henry Adams" and received much attention. He died May 27, 1918.

ADAMS, HENRY CARTER, an American editor; born in Davenport, Ia., in 1851. He graduated from Iowa College in 1874 and afterward studied at Johns Hopkins University and in Berlin and Paris. After graduating from Andover Theolog-

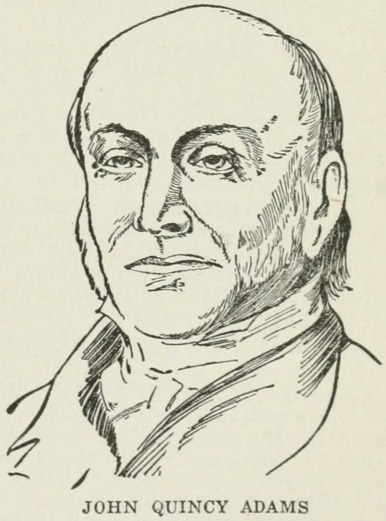
ical Seminary in 1875, he was appointed lecturer on political science in Cornell University in 1880 and in 1887 became professor of political economy and finance at the University of Michigan. He was director of the Division of Transportation in the eleventh census and from 1887 to 1911 was statistician of the Interstate Commerce Commission, being during the same period also in charge of the Division of Statistics and Accounts of that commission. From 1913 to 1916 he acted as financial adviser to the Chinese Republic. He was a member of many economic societies and received honorary degrees from Iowa College, University of Michigan and Johns Hopkins University. He wrote "Taxation in the United States, 1787 to 1816" (1884); "Public Debts" (1887); "Description of Industry" (1918); "American Railway Accounting" (1918).

ADAMS, HERBERT, an American sculptor; born at Concord, Vt., in 1856. He was educated in the common schools and at the Institute of Technology at Worcester, Mass., and studied art in the United States and in Paris. He received awards at the Chicago, Paris, St. Louis, and San Francisco expositions. In 1915 he was awarded the medal of honor by the Architectural League and in the following year received a prize from the National Academy of Design. He was a member of the Commission of Fine Arts of the United States Government, president of the National Academy of Design, a member of the American Academy of Arts and Letters and of other societies relating to art.

ADAMS, JOHN, the second President of the United States; was born at Braintree, near Boston, on Oct. 19, 1735. He practiced as a lawyer, and, in 1770, he was one of the selectmen deputed by the several towns of the province, who met in convention at Boston. In 1773, he became a member of the Council of State. He advocated and seconded the Declaration of Independence. In 1780 he represented the United States in Holland, and in 1782 co-operated with Franklin and the other American commissioners in negotiating a treaty of peace with England. In 1785 he became the first Minister Residentiary to the court of St. James, and stayed in England till 1788. In 1789, when Washington was elected President, he was made Vice-President, and in 1793 had the same office again conferred upon him. In 1797, on the retirement of Washington, he was chosen President, and at the close of his term of four years, being defeated for re-election by a majority of eight votes, given to his Democratic adversary, Jefferson, he retired from public life, and died at Quincy, July 4, 1826.



JOHN ADAMS



JOHN QUINCY ADAMS

ADAMS, JOHN QUINCY, sixth President of the United States, and one of the greatest of American orators, diplomatists, and statesmen, was the eldest son of John Adams, second President of the United States, and was born at Braintree, Mass., July 11, 1767. In 1794 he proceeded to Holland as Minister, and in 1797 to Berlin, where he negotiated a treaty with the Prussian Government. In 1803 he was elected United States Senator, and in 1805 appointed Professor of Rhetoric at Harvard. In 1809 he was appointed Minister to Russia. In 1815 he went to London as United States Minister, where he remained till 1817, when he was appointed

Secretary of State under Monroe. He was elected President of the United States by the House of Representatives in 1825, there having been no election by the people the previous year. He was defeated for re-election in 1828. In 1831 he was returned to Congress, where he remained until his death, Feb. 23, 1848.

ADAMS, MAUDE KISKADDEN, an American actress; born at Salt Lake City, Nov. 11, 1872; daughter of an actress who was leading woman of a stock company in that city, under the stage name of Adams. At 16 years of age Miss Adams joined E. H. Sothern's company in the "Midnight Bell"; afterward she was in Charles Frohman's stock company, and later supported John Drew. She made a great success in many plays from the pen of Sir J. M. Barrie, notably in The "Little Minister" and "Peter Pan." She has also essayed successfully some Shakespearean parts and the title rôles in Rostand's "L'Aiglon" and "Chantecler."

ADAMS, SAMUEL, an American statesman and Revolutionary patriot; born in Boston, Mass., in 1722. He was elected to the Massachusetts legislature in 1765, was a delegate to the first Continental Congress in Philadelphia, and a signer of the Declaration of Independence. He was active in framing the constitution of his native State, which he served as President of the Senate, Lieutenant-Governor (1789-1794), and Governor (1794-1797). He was zealous for popular rights, and fearless in his opposition to monarchism. He died in 1803.

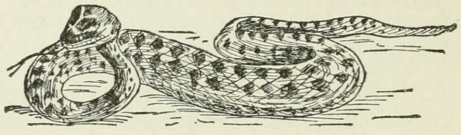
ADAMS, SAMUEL HOPKINS, an American writer; born in Dunkirk, N. Y., in 1871. He graduated from Hamilton College in 1891 and at once began newspaper work in New York. From 1903 to 1905 he was a member of the editorial staff of "McClure's Magazine." He wrote "The Great American Fraud," an exposé of the patent medicine business (1906); "The Clarion" (1914); "Our Square and the People in It" (1917), and contributed many stories and articles to newspapers and magazines.

ADAMS, WILLIAM TAYLOR, an American author and editor, best known by the pseudonym "Oliver Optic"; born July 30, 1822. He was a voluminous and highly popular writer of fiction for young readers, his works including several series of travel and adventure: "Young America Abroad," "Starry Flag Series," and others. He died March 27, 1897.

ADAMSON LAW. See RAILWAYS.

ADDAMS, JANE, an American philanthropist and social worker; born in Cedarville, Ill., Sept. 6, 1860. She was graduated at Rockford College in 1881, and after post-graduate studies in Europe and the United States, became an active social reformer. She inaugurated in 1889 the establishment known as Hull House, an adaptation of the "social settlement" plan to Chicago conditions. She has acted as street-cleaning inspector in Chicago, and has lectured on the improvement of the condition of the poor in great cities. In 1912 she took a prominent part in the formation of the Progressive party. Besides many contributions to current periodicals she has published a number of books.

ADDER, etymologically nadder, the *n* having been attracted to the article and lost, the common English name of the viper (*Vipera berus*). Its color is yellowish brown or olive, with a double series of black spots along the back. The sides are a little paler and are also spotted with black. The adder has a broad, tri-



EUROPEAN ADDER

angular head and a short tail. It rarely exceeds two feet in length. The adder is the only poisonous reptile in Great Britain, and is found in most of the countries of Europe. In the United States the name is popularly applied to several harmless snakes, but the true adder does not occur.

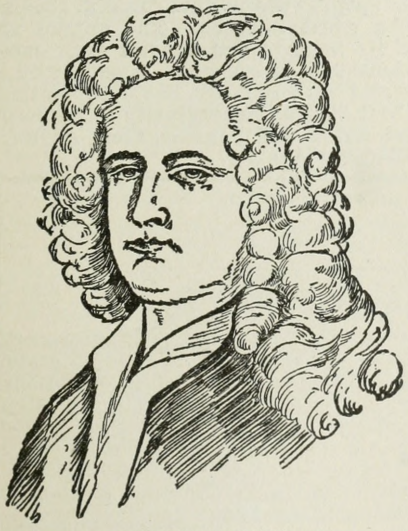
ADDING MACHINES, contrivances designed to simplify and facilitate the making of arithmetical computations. In recent years they have been greatly improved. They include cash registers, electric tabulating machines, and multiplying and dividing machines. Practically all banks and most large business concerns are now supplied with some form of these labor-saving devices.

ADDIS ABEBA, the chief city and capital of Abyssinia, in the province of Shoa. It is situated in an elevated country nearly 10,000 feet high. The town is practically without streets and is intersected by deep ravines. It contains the royal palace, which is a pretentious but flimsy structure, and is the seat of several schools. The permanent population is about 50,000. The treaty between Italy and Abyssinia was signed

in this city on Oct. 26, 1896. By its terms Italy resigned her claims to a protectorate over the country.

ADDISON, CHRISTOPHER, British statesman; born June 19, 1869, was educated at Trinity College, and pursued medical studies at St. Bartholomew's Hospital. He became a lecturer on anatomy, and wrote many works on medical subjects. In 1914 he became Parliamentary Secretary to the Board of Education, and in the Coalition Cabinet of Lloyd George was made Minister of Munitions. Later, he was appointed minister in charge of reconstruction.

ADDISON, JOSEPH, an English essayist, poet, and statesman; born at Milston, May 1, 1672. In 1693, he began his literary career with a poetical address to Dryden. Next year appeared his "Account of the Greatest English Poets," and a translation of the fourth book of the "Georgics." In 1697 he composed a Latin poem on the "Peace of Ryswick," and this, with a poem, "To the King," resulted in that, through Charles Montagu, Earl of Halifax, he obtained, in 1699, a pension of £300, and spent four years in



JOSEPH ADDISON

France, Italy, Austria, Germany and Holland, one of the results of his travels being his "Letter to Lord Halifax." "The Campaign," a poem celebrating the victory of Blenheim (1704), secured for him a commissionship of excise. Elected to Parliament for Malmesbury, he kept the seat for life.

He contributed largely to the "Tatler," started by his friend Steele, in 1709; 41 papers being wholly by Addison, and 34 by him and Steele conjointly. In March, 1711, was founded the "Spectator," 274 numbers of which (those signed with one of the letters C L I O), were the work of Addison. As a light essayist, he has no equal in English literature. His tragedy, "Cato" (1713), aroused such vehement party enthusiasm that it kept the stage 35 nights. In 1716 Addison married the Dowager Countess of Warwick and in 1717 he was appointed Secretary of State, but resigned his post, owing to his failing health, in March, 1718. He died at Holland House, June 17, 1719.

ADDISON'S DISEASE, the name of a peculiar skin disease, first described by Dr. Thomas Addison, an English physician. Its symptoms are anæmia, excessive debility, loss of appetite, faintness, flabbiness of the muscles, and a dingy brownish discoloration of the skin. The patient generally suffers from dyspepsia, vomiting, and nervous troubles. The disease has sometimes been alleviated by careful nursing, but no cure for it has been found, and in the end it is invariably fatal.

ADE, GEORGE, an American journalist and author, born in Indiana in 1866. He has published "Arte: a Story of the Streets and Town"; "Pink Marsh" (1897), a dialect story, etc. Later he established a reputation as a satirical humorist by his "Fables in Slang" and wrote many successful plays and musical comedies, such as "The Sho-Gun," "Slim Princess" and "Sultan of Sulu," etc. He was made a trustee of Purdue University and a member of the National Institute of Arts and Letters.

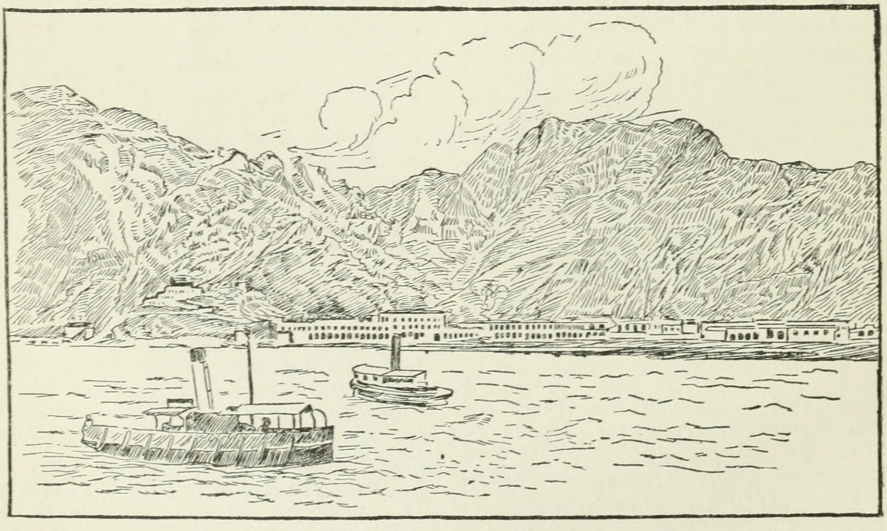
ADELAIDE, the capital of South Australia, 7 miles by rail S. E. of Port Adelaide, on St. Vincent Gulf. It stands on a large plain, and is walled in on the eastern and southern sides by the Mount Lofty range; the town proper is inclosed by a wide belt of garden shrubbery. The first settlement was made in 1836, and named after the queen of William IV. The Torrens divides the town into North and South Adelaide, the former being occupied chiefly with residences, and the latter forming the business portion of the town. Five substantial iron bridges span the Torrens, which has been formed by a dam into a lake 1½ miles long. The streets are broad and regularly laid out, especially in Adelaide proper, to the south of the river, where they cross each other at right angles, and are planted with trees. Among the public buildings are the new Parliament Houses, government offices, postoffice, and townhall;

South Australian Institute, with museum, library and art galleries; hospitals; an extensive botanical garden; etc. The chief manufactures are woolen, leather, iron, and earthenware goods; but the chief importance of Adelaide depends on its being the great emporium for South Australia. Wool, wine, wheat, flour and copper ore are the staple articles of export. There are a number of colleges and Adelaide University and a school of mines. It is the seat of an Anglican and of a Roman Catholic bishop. Glenelg, on the sea, 5 miles away, is a favorite watering place. Pop., with suburbs, about 250,000. Port Adelaide, its port, dates from 1840. It is a principal port of call for vessels arriving from Europe.

ADELPHI COLLEGE, an institution of higher learning in Brooklyn, N. Y., formerly known as the Adelphi Academy. Since 1912 both men and women have been admitted for the degree of A. B. There were, in the year 1919-1920, 502 students and 31 teachers. The president is F. D. Blodgett.

ADELSBERG (ä'dels-bārg), a town in the province of Carniola, Austria; 24 miles S. W. of Laibach. The grotto of Adelsberg, over 5 miles long, is famous for its stalactites, stalagmites, and subterranean streams. Pop. about 4,500.

ADEN, a peninsula and town belonging to Great Britain, on the S. W. coast of Arabia, 105 miles E. of the strait of Bab-el-Mandeb, the entrance to the Red Sea. The peninsula is a mass of volcanic rocks, 5 miles long from E. to W., and rising to 1,776 feet. It is joined to the mainland by a narrow, level, and sandy isthmus. The town is on the eastern shore of the peninsula, stands in the crater of an extinct volcano, and is surrounded by barren, cinder-like rocks. The main crater is known as the Devil's Punch-bowl. Frequently the heat is intense; but the very dry, hot climate, though depressing, is unusually healthy for the tropics. The Romans occupied it in the 1st century A. D. Till the discovery of the Cape route to India (1498), it was the chief mart of Asiastic produce for the Western nations; but, in 1838, it had sunk to be a village of 600 inhabitants. The increasing importance of the Red Sea route gave Aden great value as a station for England to hold; and, in 1839, after a few hours' contest, Aden fell into the hands of the British. It is of high importance, both in a mercantile and naval point of view, especially as a great coaling station; it has a garrison and strong fortifications. During the World War an unsuccessful attack against Aden was made by the Turks. The population and resources of the place have rapidly increased since 1838, and the opening of the Suez canal in 1869 gave it a great impetus. The annual value of its imports and exports each exceeds £2,000,000. Aden, which is politically connected with Bombay, has a population of about 50,000. The majority of the natives are Arabs and Somalis, from Africa, all speaking Arabic.



THE HARBOR OF ADEN

ADEN, GULF OF, the portion of sea lying between the N. coast of Aden, terminating E. with Ras Jerdaffon (Cape

Gardafui), and the S. coast of Arabia, between Ras Arrah and Ras Agab; the former in latitude 12° 40′ N., longitude 44° E.; the latter in latitude 15° 15′ N., longitude 51° 30′ E. Its length from E. to W. is thus about 480 miles; its breadth from N. to S. varying from 160 to 200 miles.

ADENITIS, inflammation of the lymphatic glands. It almost always exists with angeioleucitis—inflammation of the lymphatic vessels. It is produced when an open wound of any kind comes in contact with irritating or poisonous matter, generally from without, though sometimes also generated within itself.

ADENOIDS, a growth of spongy tissue in the region of the pharynx, lying above and back of the soft palate. The growth begins at the age of three months and during the first three years is of a soft, spongy nature. It becomes harder and more fibrous as age increases. The growth becomes detrimental to health when it is unusual in size. It is now a very general custom to remove it as early as possible. The presence of overgrown adenoids affects the child mentally and physically and their removal in most cases causes immediate improvement.

ADERSBACH ROCKS, a range of mountains in the district of Glatz, valley of the Riesengebirge, Silesia, remarkable as being divided, for several miles, into detached perpendicular columns by fissures from 600 to 1,200 feet in depth.

ADIGE (äd′ē-zhā), a considerable river of north Italy, which has its source in the Alps of Tyrol, above Brixen, where it is called Etsch; it enters Italy by Bolzano and the valley of Trento, flows in a southern direction by Roveredo, parallel to and for the most part about 6 miles from, the lake of Garda, then, turning abruptly toward the E., passes through Verona and Legnano; it afterward enters the great Delta, between the Brenta and the Po, and, forming several branches, empties its waters into the Adriatic Sea. It is a deep and rapid stream, dividing, by its course, the old Venetian territories from Lombardy proper. The valley of the Adige saw much fighting during the Napoleonic wars and again during the World War.

ADIPIC ACID (formula: $C_6H_{10}O_4$ $(C_4H_8)''$ $(CO{\cdot}OH)_2$), an organic diatomic dibasic acid, produced by the oxidation of fats by nitric acid.

ADIPOCERE, a chemical substance in its character somewhat resembling wax or spermaceti. It arises through the chemistry of nature, when the bodies of men and animals, buried in soil of a certain kind, are subjected to the action of running water, or otherwise brought in contact with moisture.

ADIPOSE TISSUE, a membrane in a state of great tenuity, fashioned into minute cells, in which fat is deposited. It occurs in man, and in the inferior animals, both when mature and when of imperfect development.

ADIRONDACK MOUNTAINS, the highest range in New York State, stretching from near Canada, on the N., to near the Mohawk river on the S., a distance of 120 miles; and from Lakes George and Champlain, on the E., to an indefinite line on the W., covering an area of about 12,000 square miles, and occupying parts of Clinton, Essex, Franklin, and Hamilton counties. These mountains, the geological formation of which is chiefly granite, run in five parallel ranges; the highest range, or Adirondack proper, is on the E. side of the district, and the peaks rise to a great height. Mt. Marcy is 5,345 feet; Gray peak, 4,900 feet; White Face, 4,870 feet, etc. This whole district, sometimes called the Adirondack Wilderness, is covered with dense forests, except the tallest peak, and some of these forests are still unexplored. The 1,000 lakes in the valleys beautifully diversify the scenery. These lakes and streams are well stocked with trout and bass, and in this district are found black bears, wild cats, deer, otter, hawks, wild duck, eagles, rabbits, partridges, etc.; but no venomous serpents of any sort. There are extensive deposits of iron ore, chiefly magnetite. Forest products supply the most important industries. Paper-pulp mills use more of the lumber than sawmills. The region has become one of the best known and most frequented recreation grounds of the northeastern United States.

ADIRONDACK PARK, a large district, principally forest land, set apart by the State of New York, in 1892, for the protection of the watershed of the Hudson and other rivers of the State, for public recreation, and for the practical study of forestry. It covers Hamilton county, and parts of Essex, Franklin, Herkimer, and St. Lawrence counties, and contains many mountains and lakes.

ADJUTANT, in military language, in the United States army, an officer selected by the colonel, whose duties in respect to his regiment are similar to those of an adjutant-general with an army.

In zoölogy, the popular name of *cinconia argala*, a grallatorial bird, belonging to the stork family. Its size is very great, its ordinary height in the erect

attitude being 5 feet. The beak is of enormous size and strength; the head is large, and the neck proportionally muscular. The adjutant is a native of the warmer parts of India, and is very useful in removing noxious animals and carrion, which it devours with great voracity. In its wild state it usually lives in companies, and chiefly frequents the mouths of rivers; it may be readily domesticated, but is very apt to display its voracity by purloining articles of food. From this bird, and from an allied species in Senegal, the beautiful marabou feathers are obtained.

ADJUTANT-GENERAL, an officer of the military staff who is one of the assistants of the commanding officer in the field. His chief work is concerned with the issuing and executing of orders and carrying on the paper details and routine. In the army of the United States there is also a department known as the Adjutant-General's Department, presided over by a general officer with the rank of brigadier-general and the title of adjutant-general. In time of war the adjutant-general is one of the important officers in the service. He has charge of recruiting, the collecting of military information, and the preparation and custody of records. The States also have at the head of their militia organizations an officer known as the adjutant-general. See MILITARY ORGANIZATION, UNITED STATES.

ADLER, CYRUS, an American educator and theologian; born in Van Buren, Ark., in 1863. He graduated from the University of Pennsylvania in 1883. After post-graduate studies at Johns Hopkins University, he became librarian of the Smithsonian Institution in 1892, serving until 1905. He was curator of historic archæology and historical religions in the United States National Museum from 1889 to 1908. In the latter year he became president of Dropsie College for Hebrew and Cognate Learning. He was president of the Board of Directors of the Jewish Theological Seminary of America and from 1890 president of this institution, and served as special commissioner to Turkey, Egypt, and other countries. He wrote many articles on Semitic philology and allied subjects, was one of the editors of the "Jewish Encyclopedia," and chairman of the Board of Editors of the "New Jewish Translation of the Bible."

ADLER, FELIX, an American lecturer and scholar; born at Alzey, Germany, 1851. The son of an eminent Jewish rabbi, he emigrated when young to the United States, where, and at Berlin and Heidelberg, he was educated. After being for some time professor at Cornell University, he founded in New York (1876) the Society of Ethical Culture, of which he is lecturer. Similar societies have been established elsewhere in the United States and in other countries. He is an effective writer and speaker. Since 1902 he has been professor of political and social ethics at Columbia University. During 1908-1909 he was the Roosevelt exchange professor at the University of Berlin. He is chairman of the National Child Labor Commission. He has published a number of books on religion and social and political ethics.

ADMINISTRATION, in law, the management of the personal estate of anyone dying intestate, or without an executor. If the deceased leaves real estate, the estate devolves upon heirs related by blood; if personal property is left and no executors named, administrators are appointed by some court. In the United States a surrogate or judge of probate appoints the administrator, and grants letters of administration as authority. The word is also applied to the official terms of the President of the United States, and the Governors of States, and to their official advisers.

ADMIRAL, the title of the highest rank of naval officer. The term is derived from the Arabic amîr, or emîr. In Great Britain, there were formerly three grades of admirals, commanding subdivisions, known as the red, the white, and the blue, from the colors of their flags, but this distinction is now abolished. In the Brtish navy, admirals are classified as admirals, vice-admirals, and rear-admirals, ranking respectively with generals, lieutenant-generals, and major-generals. These distinctions were adopted in the United States navy during the Civil War; the rank of rear-admiral being established in 1862, vice-admiral, in 1864, and admiral, in 1866, all created for Farragut. The first 9 rear-admirals rank with major-generals and the second 9 with brigadier-generals. Their pay on the retired list is 75 per cent. of active service pay. The flag of an admiral is rectangular blue with four white stars, flown at the main; that of a vice-admiral is the same shaped flag with three stars flown at the fore; that of the rear-admiral has two stars, flown from the mizzen.

ADMIRALTY, that department of the British Government which, subject to the control of Parliament, has the supreme direction of naval affairs. The high

court of admiralty is that court which has jurisdiction over maritime causes. Its judge was originally the lord high admiral, or his deputy, but is now appointed by commission from the crown. The term is applied to the building where the lords of the admiralty transact their business. In the United States all admiralty and maritime jurisdiction is assigned by the Constitution to the Federal courts.

ADMIRALTY INLET, a narrow body of water connecting Puget Sound with the Strait of Juan de Fuca. Seattle, Tacoma, and Port Townsend are the chief cities on the Inlet.

ADMIRALTY ISLAND, a mountainous island, 90 miles long, off the W. coast of Alaska, to the N. E. of Sitka; belongs to the United States.

ADMIRALTY ISLANDS, a group of 40 islands, to the N. E. of New Guinea; Basco, the largest of them, being 60 miles in length, and is mountainous, but fruitful. The total area of the islands is 600 square miles. They were discovered by Schouten, in 1616. Some are volcanic, others are coral islands. They abound in cocoa-nut trees, and are inhabited by a race of tawny, frizzle-headed savages of the Papuan stock, about 4,000 in number. Together with New Britain and some adjoining groups, they were annexed by Germany, in 1885, and became part of the Bismarck Archipelago. During the World War they were occupied by Australian forces. The Paris Peace Conference, on May 7, 1919, decided that the mandate over them should be held by Australia.

ADOLESCENCE. A well-defined period of life extending from puberty to 21 in females and 25 in males. It is marked by an unusual rapid physical growth, and the mental development during this time is also rapid. In recent years educators have come to lay special stress on the importance of developing the individual during this period.

ADONAI (a-dō'nī), a Hebrew name for the Supreme Being; a plural form of Adon, "lord," combined with the pronoun of the first person. In reading the Scriptures aloud, the Jews pronounce "Adonai" wherever the old name "Jhvh" is found in the text; and the name "Jehovah" has arisen out of the consonants of "Jhvh" with the vowel points of Adonai.

ADONIS (a-dō'nis), son of Myrrha, daughter of Cinyras, King of Cyprus, was born in Arabia. Before the birth of her son she was transformed into the tree which produces the fragrant gum, called by her name; this, however, did not hinder his being brought into the world in due season; he grew up a model of manly beauty, and was passionately beloved by Aphrodite (Venus), who quitted Olympus to dwell with him. Hunting was his favorite pursuit, until, having gone to the chase against the entreaties of his mistress, he was mortally wounded in the thigh by a wild boar. Venus, coming too late to his rescue, changed his blood into flowers. After death, he was said to stand as high in the favor of Persephone (Proserpine) as before in that of Aphrodite; but, the latter being inconsolable, her rival generously consented that Adonis should spend half the year with his celestial, half with his infernal, mistress.

ADOPTION, the act of taking a stranger into one's family, as a son or daughter; or the taking of a person, a society, etc., into more intimate relations than formerly existed with another person or society; or the taking as one's own, with or without acknowledgment, an opinion, plan, etc., originating with another; also the selecting one from several courses open to a person's choice.

In law, both ancient and modern, the act of taking a stranger into one's family constituted the person so adopted one's heir to all intents and purposes.

ADORATION OF THE MAGI, a subject treated by great artists, from Lorenzo Monaco, representative of the Florentine school, early in the 15th century, to Rubens, in the 17th century, who painted it 15 times. Florentine art, on this subject, reached its best expression through Botticelli. A celebrated picture, by him, is in the Uffizi, Florence. In this picture, the three kings are portraits of Gosino, Giuliano, and Giovanni de Medici, while the Virgin occupies a hut among ruins and rocks. Botticelli's pupil, Filippino Lippi, has also some contemporary portraits in his painting in the Uffizi. The entire scene of Tintoretto's, in the Scuola di San Rocco, at Venice, is lighted by radiance coming from the body of the Child. He represents the Venetian school, and his fresco was made famous by Ruskin in his "Stones of Venice." In Rembrandt's painting, in Buckingham Palace, the Virgin and the Child are seated at the right, while before them kneel the Magi; in the background are the kings and old men; in the distance are camels. The picture by Albert Dürer is in the Uffizi, Florence. In the Musée de Peinture, at Brussels, Belgium, is the painting by Rubens. Another of Rubens', in the Museum of Antwerp, Belgium, has

life-size figures. Paolo Veronese's splendid picture is in the Museum at Dresden. The noted triptych, called the "Dombild," in the Cathedral of Cologne, by Meister Stephan (died 1451), is considered the finest work of the early German school. Modern painters have also produced excellent works on this subject. Burne-Jones has a tapestry at Exeter College, Oxford. The fresco in the Church of the Incarnation, in New York City, is the work of La Farge.

ADORNO, a great plebeian family in Italy. It furnished many doges to Genoa. For 165 years they struggled for supremacy, especially with the Fregosi, and were definitely destroyed by Andrea Doria, in 1528.

ADOUR (ad-ör'), a river of France, which rises 6 miles to the E. of Barèges, in the department of the Upper Pyrenees, and, running by Tarbes and Dax, falls into the Bay of Biscay, 3 miles beyond Bayonne, where it joins the Nive. Its course, through many fertile valleys, is about 180 miles.

ADOWA, or **ADUA**, one of the principal towns in the kingdom of Tigré, Abyssinia, with houses built in a conical form, and arranged into streets. It is the great mart between the interior and the coast, and reaps the advantage of a transit trade between the Red Sea ports and Gondar. It was here that the Italians were decisively defeated by the Abyssinians in 1896. Population, though greatly varying, about 3,000.

ADRENALIN, the active principle of the adrenal glands. It is the most powerful astringent used and was discovered in 1901. It occurs as a light brown powder having a bitter taste.

ADRIA, in the province of Rovigo, northern Italy, is one of the oldest cities in Europe. So late as the 12th century A. D., it was a flourishing harbor on the Adriatic Sea. It still retains several interesting remains of Etruscan and Roman antiquity, with a fine cathedral. Pop. about 20,000.

ADRIAN, city and county-seat of Lenawee co., Mich.; on the Raisin river, and the Wabash, the Lake Shore, and the Toledo and Western railroads; 30 miles N. W. of Toledo, O. It is the seat of Adrian College (Methodist Protestant), the State Industrial Home for Girls, and St. Joseph's Hospital and Academy (Roman Catholic), and has important manufactures and a large farming trade. Pop. (1910) 10,763; (1920) 11,878.

ADRIAN, or **HADRIAN, PUBLIUS ÆLIUS**, a Roman emperor, born at Rome, 76 A. D. Entering the army quite young, he became tribune of a legion, and married Sabina, the heiress of Trajan, whom he accompanied on his expeditions, and became successively prætor, governor of Pannonia, and consul. On Trajan's death, in 117, he assumed the government, made peace with the Persians, and remitted the debts of the Roman people. No monarch informed himself more by traveling than Adrian. In his reign, the Christians underwent a dreadful persecution. Adrian died at Baiæ, in 139. He had great virtues, which were, however, blended with as great vices.

ADRIAN I., Pope, born at Rome; succeeded Stephen III. in 772. Adrian died after a pontificate of nearly 24 years, 795. Adrian was a man of talent and dexterity.

ADRIAN II., born at Rome; succeeded Nicholas I. in the papal chair in 867. During the pontificate of Adrian, Photius, Patriarch of Constantinople, withdrew from the Church of Rome. Adrian died in 872.

ADRIAN III., born at Rome; succeeded Marinus in 884, and died the following year.

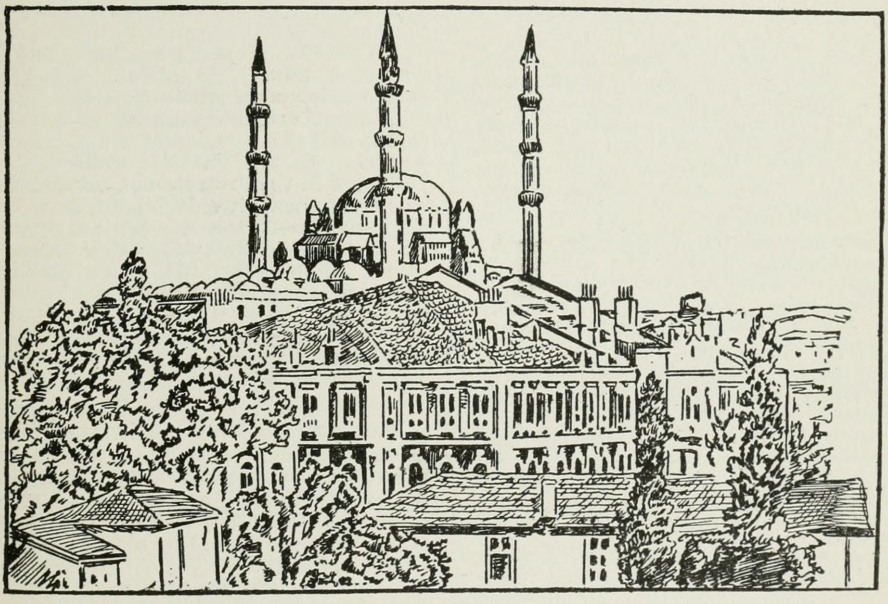
ADRIAN IV., the only Englishman who was ever raised to the dignity of the papal chair, succeeded Anastasius IV. in 1154. His name was Nicholas Breakespere; and for some time he filled a mean situation in the monastery of St. Albans. Eugenius III. created him cardinal in 1146, and, in 1148, made him legate to Denmark and Norway, which nations he converted to the Christian faith. When nominated pope, he granted to Henry II. a bull for the conquest of Ireland. He died, supposedly of poison, in 1159.

ADRIAN V., a Genoese, succeeded Innocent in 1276, and died five weeks after his election.

ADRIAN VI., born at Utrecht, of an obscure family, advanced himself by his talents to the post of vice-chancellor of the University of Louvain. Ferdinand of Spain gave him the bishopric of Tortosa. After Ferdinand's death he was co-regent of Spain with Cardinal Ximenes. He was elected pope in 1522, after the death of Leo X., chiefly through the influence of Charles V., whose authority was then spreading over Italy. He died in 1525.

ADRIAN COLLEGE, a coeducational institution of higher education in Adrian, Mich., founded in 1852. The students number about 200 and the faculty about 25. The property is valued at about $250,000. The library contains about 10,000 volumes. The president for 1919 was E. W. Anthony, D. D.

ADRIANOPLE (Turkish, Edirné; Bulgarian, Odrin), formerly the third city of European Turkey, stands on the navigable Maritza (the ancient Hebrus), 198 miles W. N. W. of Constantinople by rail. The city has upward of 80,000 inhabitants, of whom about half are Turks. The splendid mosque of Selim II., the palace, and the immense bazaar of Ali Pasha, may be named as its principal features. It has a silk factory, and a considerable trade in attar of roses and wine. Founded or greatly improved by the Emperor Hadrian, Adrianople was the seat of the Ottoman sultanate from 1366 to 1453. In the Balkan War of 1912-1913, Adrianople, after a stubborn defense of five months, was surrendered to the Balkan allies, March 26, 1913. By the Treaty of London, May 30, 1913, it was ceded to Bulgaria, but in the war that ensued between the former allies, the Turks reoccupied the city, July 20, 1913. By the Treaty of Constantinople, Sept. 29, 1913, Bulgaria formally restored Adrianople to Turkey. During the World War the city was raided many times by enemy airplanes. As a result of the Peace Treaty with Turkey, Adrianople was lost to Turkey and became part of Greece.



THE MOSQUE OF SULTAN SELIM II. AT ADRIANOPLE

ADRIATIC SEA, a large arm of the Mediterranean Sea, extending, in a N. W. direction, between the E. coast of Italy and the W. coast of the Balkan peninsula, being terminated to the S. by the Strait of Otranto, 45 miles wide. In the N. it forms the Gulf of Venice, and in the N. E. the Gulf of Trieste. The W. coast is comparatively low and has few inlets, and the N. is marshy and edged with lagoons. On the other side, the coasts of Illyria, Croatia, Dalmatia, and Albania are steep, rocky, and barren, with many inlets, and begirt with a chain of almost innumerable, small, rocky islands.

The total area of the sea, including islands, is calculated at 52,220 square miles—the area of the islands being 1,290; the mean depth is 110 fathoms, the greatest depth, 565 fathoms. The most considerable rivers flowing into the sea are the Adige and the Po. Venice, Trieste, Ancona, Bari, and Brindisi are the chief ports, Brindisi having special importance.

ADULLAM (ad-ul'am), one of the cities of the plain, in the tribe of Judah, fortified by King Rehoboam. The Cave of Adullam, where David hid when pur-

sued by the Philistines, was probably near the Dead Sea.

ADULTERATION, the act of debasing a pure or genuine article for pecuniary profit, by adding to it an inferior or spurious article, or taking one of its constituents away. Another definition which has been given is: "The act of adding intentionally to an article, for purposes of gain, any substance or substances the presence of which is not acknowledged in the name under which the article is sold." In England, as early as the 13th century, the legislature attempted, though with but partial success, to strike a blow against it, in the Act 51 Henry III., stat. 6, often quoted as the "Pillory and Tumbril Act." In the United States, and in the principal European countries, the laws against adulterations are carefully drawn and systematically administered. See PURE FOOD LAW. Deliberate adulterations are of two classes: (1) Those which are injurious to health, and (2) those which produce no seriously hurtful effects. Careful investigation has demonstrated that adulterations of the latter class are comparatively rare. The articles most liable to adulteration are milk, butter, spices, coffee, syrup, and molasses, cream of tartar, honey, vinegar, jellies and jams, olive oil and canned goods. According to reports by American official analysts, most of the staple articles of common household consumption, while frequently subjected to considerable sophistication, are seldom injuriously adulterated.

ADULTERY, unlawful intercourse between two married persons not standing to each other in the relation of husband and wife, or between a married person and another unmarried. In the former case, it has been called double, and in the latter, single adultery. Adultery is considered in England a ground for total divorce. In the United States there is a wide diversity in the laws relating to this offense. In some States it has been made a crime, while, in others, civil proceedings are allowed substantially similar to those of the English law.

ADVANCEMENT OF SCIENCE, ASSOCIATION FOR THE, an association of scientific men of the United States, Great Britain, France, and other countries. Its purpose is to place emphasis upon the unity of workers in all branches of science and to give a stronger impulse to scientific work, both practical and theoretical. The society publishes "Reports" and offers special facilities for carrying on original and difficult scientific work. The international association was formed in 1889 and the first meeting was held in Paris in the following year. The American Association for the Advancement of Science was founded in 1847. It is organized in 11 sections, each of which holds its convention at the annual meeting of the association held during the summer. The sections include those of mathematics and astronomy, physics, chemistry, mechanical science and engineering, geology and geography, zoölogy, botany, anthropology and psychology, social and economic science, physiology and experimental medicine, and education. The membership is about 8,000. Similar national associations exist in Great Britain, France, South Africa, Australia, and other countries.

ADVENT, a term applied by the Christian Church to certain weeks before Christmas. Anciently, the season of Advent consisted of six weeks, and this is still the duration of it in the Greek Church. In the Catholic Church, however, and in the Protestant Churches that observe Advent, it only lasts four weeks, beginning with the Sunday nearest St. Andrew's Day (Nov. 30), either before or after. It is appointed to be observed as a season of devotion, being intended to commemorate the coming of Christ in the flesh, and to direct the thoughts to His second coming. This season was observed with great austerity by the primitive Christians.

ADVENTISTS, a sect in the United States, founded by William Miller, and sometimes called Millerites, which believed that Christ's second coming would occur in October, 1843. When their hopes were not realized, the number of believers decreased. The Adventists still look with certainty for the coming of Christ, but not at a fixed time. They are now divided into the following bodies: Evangelical, Advent Christian, Seventh Day, Church of God, Life and Advent Union, and Churches of God in Jesus Christ. The largest of these is the Seventh Day Adventists, with (in 1919) 4,181 churches, 162,667 members, 1,102 ordained ministers, 5,610 Sabbath schools, 1,446 young people's societies, 41 publishing houses printing 142 periodicals, 32 sanitariums, and total contributions amounting to over $6,985,000. Of the 77 educational institutions connected with the church 16 have college courses. The other four branches had a total membership (1919) of about 45,000, with 850 churches and 970 ministers.

ADVERTISING, in its primary sense, a notification. In some form it has existed from the earliest times, wher-

ever men were gathered into communities and it became necessary for whatever reason to impart information. In its primitive form it was verbal and carried on by messengers. The town crier retailing the news of his small community to his fellows in the market place was an advertiser. Later on, when writing became known, the written work began to take the place of the word of mouth. Advertisements have been found in the clay libraries of Chaldea and in the papyri of Egypt. It was early adapted to the needs of commerce, although when illiteracy was the rule, this often took the form of pictures or symbols. Storekeepers, for instance, who sold milk had the picture of a cow displayed so as to tell illiterate servants where they could find what they wanted. Tavern signs displayed in crude pictorial form the special claims or merits of the hostelry.

With the invention of printing, an immense impetus was given to advertising. The gazettes and other printed sheets of the England of some centuries ago devoted an increasing amount of their limited space to notification of runaway apprentices or wives, or extolled the merits of some particular coffee or play house. Nostrums of all kinds were widely advertised and formed a target for the wit and satire of Addison. To such an extent had this developed in the time of Dr. Samuel Johnson, that in the innocence of his heart he asserted that the art of advertising had reached perfection.

In the sense of the word in which advertising is used to-day, it is a comparatively modern development. In the United States its really important beginnings were contemporaneous with the growth of newspapers, the extension and perfecting of the postal service, the building of railroads, and the invention of the telegraph. It began to be seen that merchandise could be sold at a profit beyond the limits of the community in which the business or manufacturing plant was located. At first, however, the field was so largely engrossed by the sellers of patent medicines, nostrums, and shady schemes, designed to ensnare the gullible, that there was a tinge of disrepute connected with it, and respectable merchants were diffident about being found in such company. Gradually a saner view manifested itself, and efforts which became increasingly successful were made to drive out the quacks and adventurers and leave the field to reputable concerns. Flamboyant, exaggerated and untruthful statements in some cases wrought their own cure by their very excesses. The process of elimination of this class of advertising was accelerated by the co-operation of the postal authorities and the publishers of reputable papers and magazines. To-day the fraudulent or illegitimate advertisement is the exception, where formerly it was the rule. Advertising matter is carefully scanned by the leading periodicals, and if dubious is declined. Some papers even go so far as to refund at their own cost any loss suffered by reliance on an advertisement inserted in their columns.

While newspapers and periodicals are the chief advertising media, they by no means engross the field. Billboards and electrically lighted signs acquaint the public by day and night with the merit of a given article and impress upon the mind the name or trade-mark of the manufacturer. Street-car advertising is carried on to a vast extent, and when it is remembered that 5,000,000,000 cash fares are paid annually in the United States the importance of this medium is made manifest. Hundreds of millions of dollars are spent every year in mail order advertising, where through the medium of a letter, circular, or catalogue, the advertisement goes direct from the merchant to his potential customer. The work is furthered by large and well-equipped advertising agencies, who act as skilled advisers to the business man who seeks a market for his goods, and enable him to get the largest return at the least expenditure.

The psychology of advertising has been a subject of incessant study, and it has been accepted that at least four elements are essential to every effective advertisement. It must (1) attract attention. Hence the value of clever slogans and attractive headlines. It must (2) arouse interest. This is done by a clear, simple, not too long statement of the merits of the article in question. It must (3) create desire. This is done by showing how the acquisition of this article will benefit the reader personally. And it must (4) inspire decision on the part of the person addressed to make that article his own. There are infinite variations, but an advertisement that lacks any one of these four elements is practically worthless.

Advertising has reached its highest development in the United States where it has become a recognized element of nearly every large business. So-called "national" advertising is carried on through magazines and papers of wide circulation and these are able through this circulation to demand for their space extremely large sums, ranging from $1,000 to $5,000 per page for one insertion.

Although advertising has reached such an enormous development in the United States, it is still generally considered to be in an empirical condition. The methods and forms to be used in advertising campaigns to a great extent are left in the hands of advertising experts to determine the mediums to be used. By keeping a strict account, by means of "keys," of the number of inquiries received through each medium, it is possible to a large extent to arrive at a knowledge of their respective values as advertising mediums. In spite of this, however, there still remains a large element of chance. Attempts to reduce this element have been made on an elaborate scale by Professor Walter Dill Scott and others, who have analyzed advertising over a number of years in an elaborate manner, and have been able to arrive at an estimate of averages which have been of great value.

During the World War all the leading governments involved entered upon advertising on a large scale, first to secure enlistments in their armies and afterward to raise the large sums necessary for carrying on the war and for the relief work which accompanied it. While all agencies of advertising were employed in this work, the most notable and picturesque method was the employment of posters, many of them executed with great care by the most eminent artists in the various countries. Many of these were of great beauty and artistic merit.

The development of advertising has been accompanied by abuses. These usually take the form of disfiguring public places and landscapes with advertising signs, especially along the lines of railways. Societies have been organized to prevent this, with excellent results. Several railways have undertaken to rid the landscapes through which their lines pass of objectionable signs. Similar efforts have been made to limit the erection of billboards in cities to places where their presence would be most inoffensive.

Accompanying the conditions of the business world which followed the World War, advertising took on a great impetus in 1919 and 1920. This resulted not only from a desire on the part of business men to increase their revenue, but also from the fact that many firms found it more profitable to invest large sums of money in advertising than to pay them out in the form of taxation on their surplus profits. As a result of this, many magazines of large circulation acquired an enormous revenue through increased advertising. In many cases the space given to the advertising pages greatly exceeded those devoted to text matter, even in magazines devoted to general literature. There are many journals devoted to the technique of advertising and several of these have a very wide general circulation.

ADVOCATE, (1) Originally one whose aid was called in or invoked; one who helped in any business matter; (2) In law, at first, one who gave his legal aid in a case, without, however, pleading, this being the function of the *patronus;* (3) The *advocatus fisci,* who attended to the interests of the fiscus, or the emperor's privy purse.

In the old German empire, a person appointed by the emperor to do justice.

In the Mediæval Church, one appointed to defend the rights and revenues of a church or monastery. The word advocate, in the sense of a defender of the Church, was ultimately superseded by that of patron, but it still lingers in the term advowson.

In English law, originally one who pleaded a cause in a civil, but not in a criminal, court.

Now, in English and American law, one who pleads a cause in any court, civil or criminal. It is not, properly speaking, a technical word, but is used only in a popular sense, as synonymous with barrister or counsel.

In the army the judge-advocate is the officer through whom prosecutions before courts-martial are conducted. There is also a judge-advocate-general for the army at large.

In Scotch law an advocate is a member of the faculty of advocates, or Scottish bar.

ÆDILE, in ancient Rome magistrates who had charge of public and private buildings, of aqueducts, roads, sewers, weights, measures, the national worship, and, specially, when there were no censors, public morality. There were two leading divisions of ædiles—cereales and curule. Their insignia of office were like those of the old kings—the *toga prætexta* (a purple robe), and the *sella curulis,* or curule chair, ornamented with ivory.

ÆDUI (īd'wē or ed-ū'ē), one of the most powerful tribes in Gaul at the time of Cæsar's arrival (58 B. C.). They formed an alliance with Cæsar, who freed them from the yoke of Ariovistus, but they joined the rest of the Gauls under Vercingetorix in the great and final struggle for independence. After his victory, Cæsar treated them leniently for the sake of their old alliance. Their principal town was Bibracte.

ÆGEAN ISLANDS. See ARCHIPELAGO.

ÆGEAN SEA (ē-jē'an or ī'gā-an), the old name of the gulf between Asia Minor and Greece, now usually called the Grecian Archipelago.

ÆGEUS (īg'ös or ēj'us), a king of Athens, son of Pandion, and father of Theseus. When the latter sailed to Crete to deliver Athens from the intolerable burden of the tribute due to the Minotaur, he promised his father to hoist white sails on his return as a signal of safety. But the hero forgot his promise in the joy of triumph; and his father, who was anxiously watching for the sign of victory, seeing only the black sails of his son's ship as it approached the coast of Attica, believed that he had perished, and flung himself into the sea, which from him was named the Ægean.

ÆGINA (ē-jī'na), a Greek island about 40 square miles in area, in the Gulf of Ægina (the ancient *Saronicus Sinus*). It is mountainous, with deep valleys and chasms. The modern town of Ægina stands on the site of the ancient town, at the N. W. end of the island. The island contains about 8,000 inhabitants. The most ancient name of the island was Œnone, and the Myrmidons dwelt in its valleys and caverns. For a century before the Persian war it was a prosperous state; during this period it was also the chief seat of Greek art. Its sailors covered themselves with glory at Salamis.

Æginetan Sculptures.—Ægina holds an important position in the history of Greek art. On an eminence in the eastern part of the island stand the ruins of a temple of Pallas Athene. Among these ruins a series of statues were excavated in 1811, which are now the most remarkable ornaments of the Glyptothek at Munich. One group represents a combat of Greeks and Trojans for the body of Achilles. The figures are true to nature, with the structure of bones, muscles, and even veins, distinctly marked, but there is no individuality, all the faces having that uniform forced smile which is characteristic of all sculpture before the time of Phidias. Probably they date from not more than fifty years before Phidias.

ÆGIS (ē'jis or ī'gis), the shield of Zeus, which had been fashioned by Hephæstus (Vulcan).

AEHRENTHAL, ALOIS LEXA, COUNT VON, a statesman of the former Austro-Hungarian Empire, born in 1854. He was educated at Bonn and Prague Universities, entered the diplomatic service in 1877, and was rapidly advanced until 1888, when he was appointed Minister to Rumania. In the following year he became Ambassador to Russia and served in this capacity until 1906, when he was appointed Premier and Minister of Foreign Affairs of the Austro-Hungarian Empire. It was largely through his influence that the Turkish provinces of Bosnia and Herzegovina were annexed to the Austrian Empire. At first he worked in close co-operation with the Archduke Francis Ferdinand, heir to the throne. This association continued until 1910, when Aehrenthal withdrew from the aggressive party and became the head of the peace party. The two men quarreled and Von Aehrenthal offered his resignation which, however, was not accepted by the Emperor, who fully supported his peace policy. In the turmoil, however, his health had suffered and he died in 1912.

ÆLFRIC, an Anglo-Saxon abbot, surnamed GRAMMATICUS; born about 955. He wrote in vigorous Old English, compiled a Latin grammar and glossary, and translated most of the historical books of the Old Testament and canons for the regulation of the clergy. He died about 1020.

ÆNEAS (en-ē'as), a Trojan prince, son of Anchises and the goddess Venus. The care of his infancy was intrusted to a nymph; but at the age of 5 he was recalled to Troy. He married Creusa, Priam's daughter, by whom he had a son, called Ascanius. When Troy was in flames, he carried away upon his shoulders his father Anchises and the statues of his household gods, leading by his hand his son Ascanius, and leaving his wife to follow behind. According to Vergil and other Latin authors, he was sailing from Sicily to Italy when he landed in Epirus, and was driven on the coasts of Africa and received by Dido, Queen of Carthage, to whom, on his first interview, he gave one of the garments of the beautiful Helen. Dido being enamored of him, wished to marry him; but he left Carthage by order of the gods. In his voyage he passed to Cumæ, where the Sibyl conducted him to hell, that he might hear from his father the fate which awaited him and all his posterity. After a voyage of seven years, and the loss of 13 ships, he arrived in the Tiber. Latinus, the king of the country, received him with hospitality, and promised him his daughter Lavinia, who had been before betrothed to King Turnus by her mother Amata. To prevent this marriage, Turnus made war against Æneas and was killed. Æneas married Lavinia and succeeded his father-in-law. His reign was but of short duration, various accounts being given of the cause of his death.

ÆNEID, one of the great epic poems of the world. It was written in Latin by Vergil, and published after his death, which took place about 16 B. C. Its hero is Æneas, one of the Trojan chiefs, whose adventures during and after the siege of Troy it recounts, till the time when he succeeded in fully establishing himself in Italy.

ÆOLIAN or **ÆOLIC**, one of the three great dialects of the Greek language, the others being the Doric and the Ionic. The expression, Attic dialect, often occurs, but this should be regarded as the normal type of Greek rather than as a divergent dialect of that tongue.

ÆOLIAN HARP, a harp played by Æolus—in other words, by the wind. It is made by stretching strings of catgut over a wooden sound-box. If exposed to the action of the wind, a succession of pleasing sounds proceeds from it, plaintive when the breeze is slight, but bolder as it increases in force.

ÆOLIANS, the name of one of those peoples classed under the general appellation of Greeks. We trace the name of Æolians to Thessaly, their primitive abode, as far as we know, where they appear to have been closely related to the Phthiotic Achæans of the same country. The Æolian colonies on the Asiatic main land were widely spread, extending at least from Cyzicus, along the shores of the Hellespont and the Ægean, to the river Caicus, and even the Hermus. There were 12 cities or states included in the older settlements in that tract of Asia Minor on the Ægean, which was known in Greek geography by the name of Æolis, and formed a part of the subsequent larger division of Mysia. Smyrna, one of them, which early fell into the hands of the Ionians, the neighbors of the Æolians, still exists nearly on the old spot, with exactly the same name.

ÆOLUS (ē'ō-lus), the god of the winds, who was fabled by the early poets to have his seat in the floating island of Æolia; but the Latin and later Greek poets placed him in the Lipari Isles. Here the winds were pent up in vast caves, it being the duty of Æolus to let them loose and to restrain their violence at the pleasure of Jupiter.

ÆON, a period of time, a lifetime, a generation; a long space of time, eternity; a space of time clearly marked out; a period, an age, a dispensation.

In modern science and literature, a period of immense duration, specially one of those which geology makes known, as the Silurian and Devonian æons.

AËRIAL LAW. See AERONAUTICS.

AËRODYNAMICS, the science which treats of the force exerted by air when in motion.

AËROLITE or **AËROLITH**, a stone which falls from the air, or sky. The name is somewhat inappropriate, now that it is known that the connection of these stones with the air is but slight, they simply traversing it as, under the operation of gravity, they fall from the regions beyond to the earth. See METEORITE.

AERONAUTICS, the science of artificial flying.

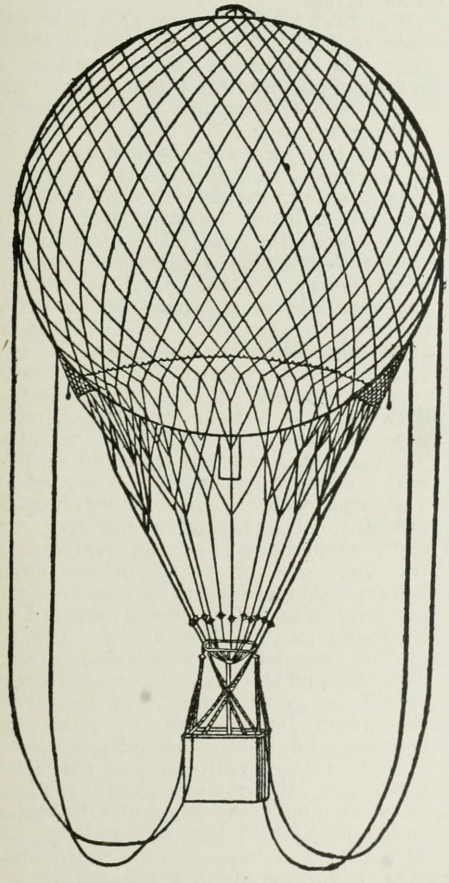
The first ventures into this field date back to 1783. They were based chiefly upon the discovery by Cavendish of hydrogen gas, and his demonstration that it was lighter than air. Scientists were quick to grasp the idea that if containers of sufficient size and light weight could be secured and filled with hydrogen they would ascend. The first experiments in balloons, however, were carried on without the use of hydrogen gas. Stephen and Joseph Montgolfier, brothers, of Annonay, France, in 1783 made a paper balloon of a capacity of 700 cubic feet, which they filled with heated air from a fire beneath the bag. On June 5, 1783, this pioneer in aerial navigation rose to a height of a thousand feet. A little later, a French scientist, Charles, with Cavendish's discovery in mind, planned a balloon which should be filled with hydrogen gas instead of heated air. The first obstacle encountered was the difficulty of creating a perfectly air-tight envelope. This was overcome by the discovery by two brothers named Roberts, that a coating of dissolved rubber over silk fabric would prevent the hydrogen gas from escaping. The test of this new balloon was made on Aug. 20, 1783, and the bag as soon as liberated rose to a great height, but because of too great inflation of the gas split asunder and fell to the ground.

Hitherto the balloons had carried no passengers, but on Nov. 21, 1783, Pilâtre de Rozier and the Marquis d'Arlandes sailed over the Seine and a large part of Paris in a balloon filled with heated air, remaining above the earth 25 minutes. A few days later, Dec. 1, an ascent was made by Messrs. Charles and Roberts in a balloon filled with hydrogen gas. In the two years ensuing, many flights were made, the most notable of which was that of Blanchard, the Englishman, who, accompanied by an American, Dr.

Jeffries, crossed the English Channel from Dover and landed at Calais.

Up to this time ballooning had been carried on as an adventure or a sport. Scientists intervened, and sought through this novel medium to ascertain scientific data that so far had been based only on conjecture. The first ascent with this object in view was made in 1804 from Paris. It was learned that as the balloon rose the air became drier and that at 23,000 feet the chemical composition of the air did not vary from that at the surface of the earth.

The two most notable ascents recorded were those made by Glaisher and Coxwell in September of 1862 and of Berson



SPHERICAL BALLOON—UNITED STATES

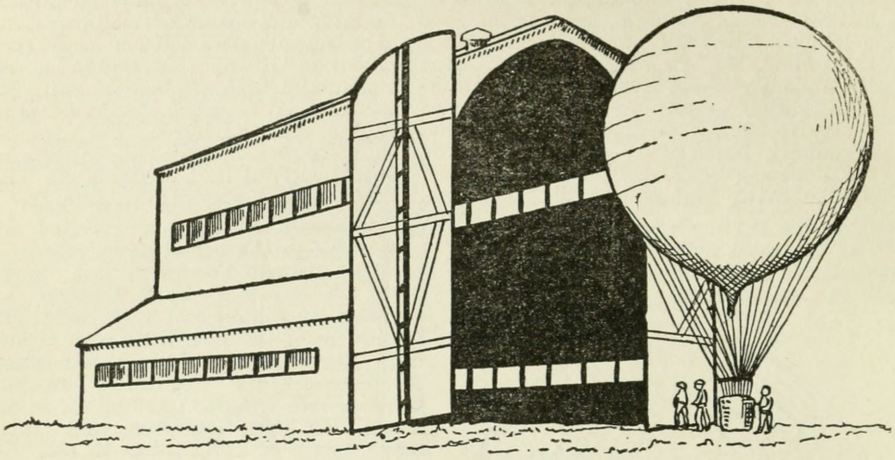
and Suring, July 31, 1901. In the former ascent it was claimed that a height of seven miles was reached, but this was not susceptible of proof, because at 29,000 feet Glaisher lost consciousness. The ascent continued until Coxwell, who was almost paralyzed, opened the valve with his teeth, and the balloon finally landed with both passengers safe. More reliable figures as to altitude were those recorded by Berson and Suring, when they ascended from Berlin to a height of 6.7 miles. This is the greatest height that has ever been attained by men in a balloon, although it was exceeded by Major Schroeder of America who reached an altitude of 33,113 feet in an airplane.

Within the last twenty-five years, many notable balloon flights have been recorded, some of them negotiated with great risk to the aerial adventurers. Up to the present century, the longest flight was that made by M. Goddard, who traveled the distance of 1,032 miles from Leipsic to Wilna in a little over twenty-four hours. In 1900 De la Vaulx covered the distance from Vincennes, France, to Korosticheff, Russia, 1,193 miles, in 35¾ hours. In 1912, Dubonnet and Dupont made a trip of 1,211 miles in the "Condor II." But a still longer flight was that of Rumpelmayer, who on March 24, 1913, completed a journey of 1,493 miles from Paris to the vicinity of Kharkoff, Russia. In America, Hawley and Post in the balloon "America" drifted 1,172 miles from St. Louis, landing in a dense Canadian forest.

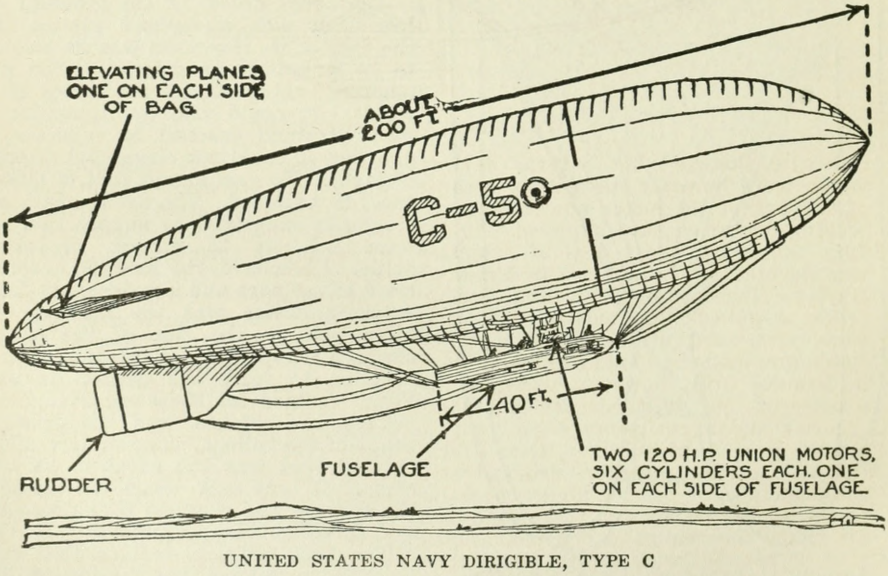
The great defect of the globular balloon that was recognized almost from the date of its invention was its inability to be propelled or steered. The huge machine was wholly at the mercy of the winds. It could rise by lightening its load; it could descend by releasing its gas; but it could not choose its direction of flight. No goal except that of altitude could be achieved. The devices that were originally employed to supply this need were such as to almost provoke a smile. Blanchard, the English aeronaut, tried to use oars and a rudder, but failed. Another device was the making of a large hole in the side of the balloon, through which the gas escaping was by reaction to force the balloon forward. What doomed all these contrivances to failure in advance was the spherical shape of the balloon. The surface offered to the wind was too great to be overcome. It was only when the shape of the balloon was changed that propulsion and direction became possible.

The first dirigible balloon that could be called a success was the invention of Giffard, a Frenchman. He constructed a spindle-shaped bag that was 143 feet long, 39 feet in diameter, and had a capacity of 75,000 cubic feet. From beneath the bag hung a car that carried a 3-horse-power engine that drove a three-blade propeller at the rate of 110

turns a minute. A triangular sail at the end served as a rudder. The first trip had only a relative success, as the strong wind was inimical to the experiment, but Giffard demonstrated that he could steer his craft readily and attain a speed of from six to ten feet a second. He had solved the problem of directed and propelled aeronautical voyaging. His work was greatly improved on by a compatriot, Renard. In 1884 he built the airship "La France," which was a pronounced success. His motive power was electricity, furnished by a motor that weighed 220 pounds and had 9 horse power. In 1898 Santos-Dumont, a resident of Paris, though of Brazilian birth, made notable advances in the development of the dirigible and created a sensation a little later by the ease and accuracy with which he circled the Eiffel Tower in Paris. In Germany, the famous aircraft that took its name from its indefatigable inventor, Count Zeppelin, was pushed to completion in 1900, but it was not until 1910 that the first great passenger Zeppelin made its initial trip over Lake Constance and made aerial traveling a matter of ease and luxury and measurably of safety. Scientific study of temperatures at high altitudes has been facilitated.

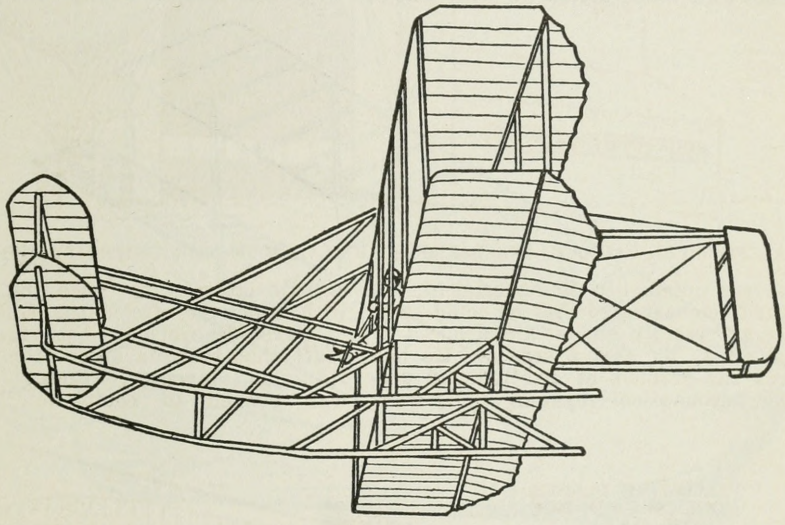


A SPHERICAL BALLOON AND BALLOON SHED USED IN THE UNITED STATES ARMY



UNITED STATES NAVY DIRIGIBLE, TYPE C

While the invention and perfecting of the balloon was a triumph of human ingenuity, it offered few of the difficulties that faced those who dreamed of navigating the air in a heavier-than-air machine. The very name seemed to defy the immutable law of gravitation. But the audacity of the idea acted as a stimulant rather than a deterrent. For centuries, men have tried to achieve the seemingly impossible. In the time of the Renaissance, Leonardo da Vinci, who did so many things and did them excellently, sketched out several devices, which were however ineffective, because of the lack of the motor power that succeeding centuries have supplied. In the 19th century a great deal of attention was devoted to the subject in England. Gayley, Henson, Wenham and Stringfellow supplied illuminating ideas that were afterward utilized, and contributions were made by Pénaud and Mouillard in France. Only, however, with the approach of the 20th century did these theories and experiments begin to give a real promise of success. Otto Lilienthal, a German inventor, demonstrated the principles of passive flight, the value of the arched wings and the pressure of air upon the wings at various angles. Had he not met with a fatal accident in 1896, he might have anticipated the Wrights. Pilcher, Chanute, and Montgomery elaborated and improved on Lilienthal's work. In the period between 1890 and 1903, aeroplanes were built by Langley in America, Ader in France, and Maxim in England, but though they represented marked advances on anything before achieved, they fell short of real success. Both Maxim's and Adler's machines were wrecked at their first trial. Langley did somewhat better. Congress had appropriated $50,000 to further his invention. He had constructed a tandem monoplane with 48 feet of wing spread and 52 feet in length. A 50-horse-power engine was employed. His experiments were carried on over the Potomac river, but at each of its two trials the machine was wrecked and thrown into the river.

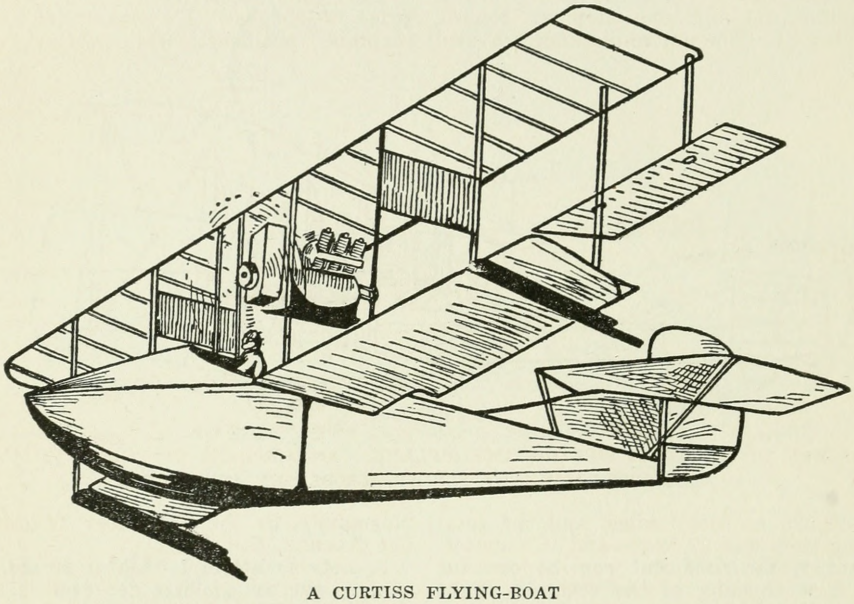


THE FIRST WRIGHT BIPLANE

While the defective launching apparatus was chiefly responsible for the failure, there was a reaction in public interest, no more money was furnished by Congress, and the project was generally ridiculed.

It remained for the Wright brothers, two remarkable young men of Ohio, to achieve the actual mastery of the air in a heavier-than-air machine. During their boyhood days, they had been obsessed by the idea of flying, but their thoughts did not take a practical turn in that direction until 1896. Then they gave themselves up to experiment and study, and in 1900 began to try to fly at Kitty Hawk, N. C., where the sand dunes and wide spaces gave them ample room for tests. Nearly three years passed, however, years of tremendous labor and concentrated thought and indomitable resolution. Then, on Dec. 17, 1903, they actually flew in a light glider fitted with a small motor. Their first flights lasted only for from 12 to 59 seconds. But they had flown—and the aeroplane was born.

Even then they did not spread their success broadcast, and it was only in 1908, after five years more of hard work, that they made a flight in public. But such news travels fast, and the world of science and invention was immensely stirred by what was permitted to be known. A school of enthusiastic experimenters sprang up in France, and practical results were soon shown by Blériot, Farnam, Delagrange and others, who by applying what they had learned of the work of the Wrights, constructed machines that made actual flights. The



A CURTISS FLYING-BOAT

first officially recorded European aeroplane flight was made by Santos-Dumont in 1906. He flew a distance of 700 feet, remaining in the air for 21 seconds. In 1907 Farnam flew 2,500 feet in 52.5 seconds. In 1909, Blériot crossed the English Channel from Calais to Dover in 37 minutes. In 1908, the Wright brothers visited France and made flights of several hours' duration. They were showered with honors by the French Government and people. From that time on the art of flying took its place as an important factor in the world's life and progress. For the military history and uses of aeroplanes, see AVIATION IN THE WORLD WAR, below.

There are three leading types of planes in general use. The monoplane, as its name implies, has one plane surface; the biplane has two, one above the other, and is by far the most common; the triplane has three, and its value lies in the greater load that it is able to carry. The monoplane has extreme speed because of its lightness and can climb more readily than the others, but its management demands proficiency and involves more hazardous risks. It is unexcelled for sport or racing, but its inability to carry heavy loads detracts from its practical value. The biplane can adapt itself to almost any conditions of air and weather, and its strength and carrying capacity have made it the most popular type. The triplane is as yet little used, but it can be depended upon as a cargo and passenger carrier because of its strength. A combination of aeroplane and boat is the hydroaeroplane, that can navigate either element. Some of them carry single floats and others double floats, for the purpose of alighting on the water. Strength is a prime requisite in their construction, in order to enable them to withstand the buffeting of the waves. The buoyancy of the floats, in order to insure safety from disaster, should be double the weight of the machine when it is loaded to capacity.

During the World War the attention of the world was engrossed by the great conflict, and there was little time or opportunity for spectacular or long-distance flights. But with the cessation of the struggle there came in quick succession a series of endurance and distance contests that broke all previous records in the history of aviation. A class of airmen had been developed to

whom danger was a part of the day's work, and feats were attempted that previously would have daunted the most daring. Prominent among these were the transoceanic flights. The honor of first having crossed the ocean in a heavier than air machine fell to America. On May 16, 1919, the United States navy seaplane "NC-4" "hopped off" from Trepassey Bay, Newfoundland, on the first leg of a trip to Lisbon, Portugal. It made the distance to Horta in the Azores, 1,200 miles, in 15 hours and 18 minutes. It reached Lisbon on May 27, and then flew from there to Plymouth, England, making one stop at Ferrol, on May 31. The entire distance traveled

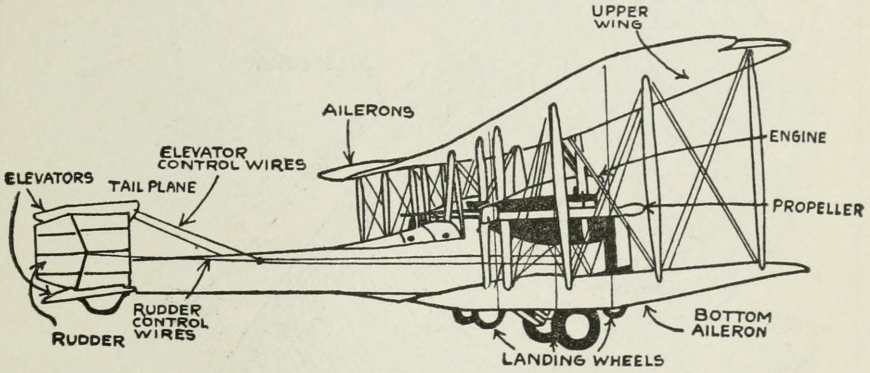


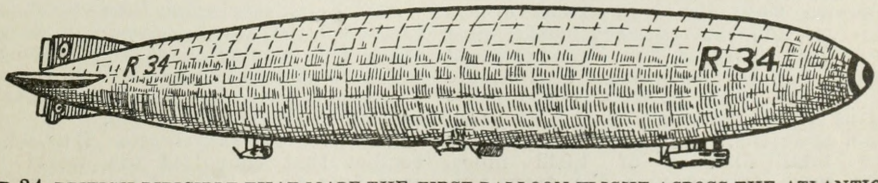
DIAGRAM OF A BRITISH VICKERS-VIMY BIPLANE. AN AIRPLANE OF THIS TYPE MADE THE FIRST NON-STOP FLIGHT ACROSS THE ATLANTIC

was 3,925 nautical miles, and the total flying time was 57 hours and 16 minutes.

But while America won honors for the first crossing of the ocean, a flight that was still more sensational, because it involved no stop on the way and because the hazards attending it were greater, was that made by Captain John Alcock, of England, who with one companion flew from St. John's, Newfoundland, to Clifden, Ireland, a distance of 1,960 miles, in 16 hours and 12 minutes. The trip was made in a Vickers-Vimy biplane with a Rolls-Royce engine. The trip was started on June 14, 1919, and from the beginning the conditions were the worst imaginable. The aviators had no light from sun or moon or stars. They passed through alternate layers of fog and cloud and snow. At times they had to climb out and chip the ice off their engine. There were periods when they did not know whether they were traveling in the customary way or upside down. They were at one time so near the surface of the sea that they were in danger of being engulfed. But they plunged on, and the following morning their machine landed nose down in a bog at Clifden, Ireland. The aviators were badly shaken up, but not otherwise injured. Alcock was knighted for his exploit and received the "Daily Mail" prize of $50,000. He was killed in an airplane accident, while flying over Normandy in the December following. See ALCOCK, SIR JOHN.

A notable attempt, that if it did not achieve success at least deserved it, was the flight of Hawker and Grieve. They started to cross the Atlantic in a Sopwith biplane May 18, 1919. The team flew from St. John's directly toward Ireland, but after traveling twelve and a half hours and making about 1,100 miles, the circulation system became clogged and they were forced to descend. Luckily they were picked up by a Danish steamer, and six days later were landed in England, where they had been given up as lost.

The first dirigible to cross the Atlantic was the British airship "R-34." This



R-34, BRITISH DIRIGIBLE THAT MADE THE FIRST BALLOON FLIGHT ACROSS THE ATLANTIC

gigantic craft was 643 feet long, was driven by five engines of 275 horse power each and was capable of a speed of from 40 to 60 miles an hour. She left East Fortune, Scotland, on July 2, 1919, and landed at Mineola, N.Y., in 108 hours and 12 minutes flying time. The distance was 3,130 miles. Her return to England, July 9-12, was made in 74 hours and 56 minutes. The total distance traveled in the round trip was 6,330 miles, and the time was 183 hours and 8 minutes.

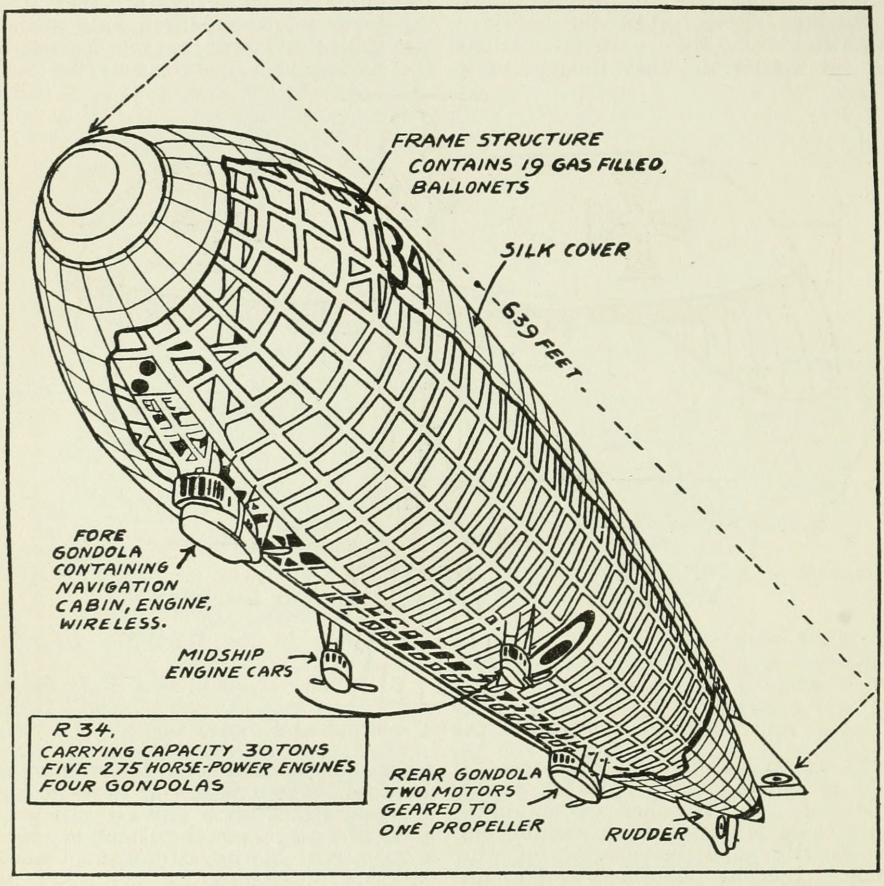


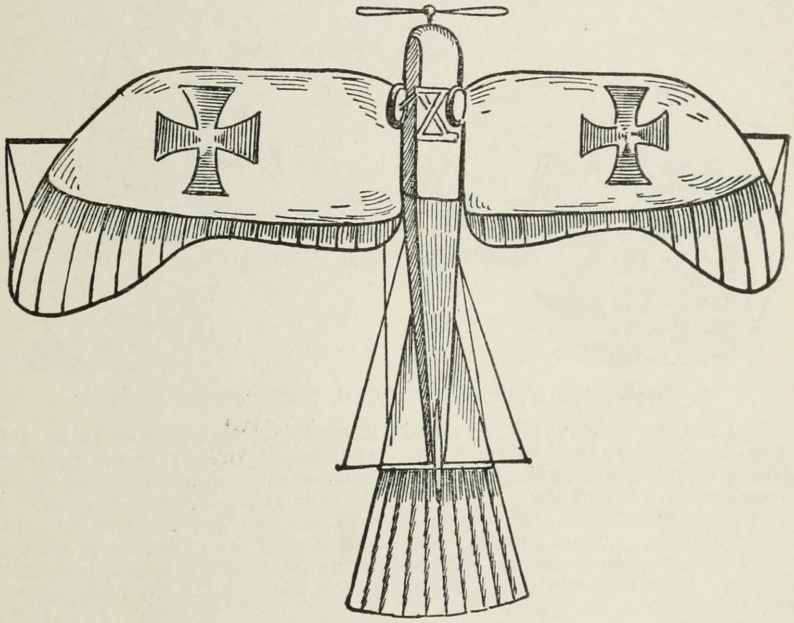
DIAGRAM OF THE BRITISH DIRIGIBLE R-34

Other notable events in aviation in America were the New York-Toronto air race and the trans-continental race from New York to San Francisco and return. In the first-named contest, the winner was Lieut. B. W. Maynard as regards actual net flying time. He averaged more than two miles a minute for the total distance of 1,042 miles. The same aviator won the trans-continental race, completing the round trip of 5,400 miles in 67 hours, 3 minutes and 40 seconds. In the spring of 1920, a successful flight was made by British aviators from Cairo to the Cape in Africa. On Dec. 10, 1919, Captain Ross Smith, an Australian aviator, landed at Port Darwin, Australia, thus winning the aeroplane race from London to Australia, via India, which had been begun on Nov. 12. The altitude record was made by Major R. Schroeder of America, who rose to a height of 33,113 feet on Feb. 27, 1920.

Aerial mail service has been established in the United States between important cities, and regular cargo and passenger service is maintained by air from London to Paris, Rome to Milan, and from Berlin to various cities of Germany.

Aviation in the World War.—The conflict that convulsed the world for over four years differed from any that

preceded it, in the use of aviation as an offensive and defensive arm of military service. The airplane had been demonstrated as really practicable for navigation of the air only since 1908, when the Wright brothers had given their tests in Paris. For some time after that, it was thought of chiefly in connection with sports, and realization of its great importance in war was slow in coming. Even when the military authorities of the various nations took the matter up, they thought of it chiefly as an aid in reconnoissance. It could go where human spies or scouts could not. No trenches or entanglements could hinder it from seeking out the location and movements of the enemy. But its enormous value for other work was apprehended dimly if at all. This was shown by the comparatively small number of planes possessed by the belligerents when the war started. Germany, the best equipped of all the warring nations in this respect, had not quite 1,000; England had only 250, and France had barely 200.



A GERMAN "TAUBE" MONOPLANE

As a scout, the airplane may be said to have met expectations. The movements and concentrations of the enemy were detected with a fair amount of success. It was not wholly and always reliable, however, especially as the war progressed, and both sides grew expert in camouflaging their movements and taking advantage of darkness for withdrawals and renewals of troops. Two notable failures of aerial observers occurred when the Germans were able to concentrate vast masses of men on a Verdun sector in 1916 with the French generals all at sea as to the direction from which the attack was coming, and again when Hindenburg was able to withdraw his men from the Arras salient in March, 1917, without the Allied aviators having learned of the movement. The reasons for these occasional failures can be readily understood. The aviator has to fly so high to avoid attack from anti-aircraft guns, or so fast to escape the attack of enemy airmen, that his opportunities of observation are lessened. A height of less than 10,000 feet was considered unsafe, as anti-aircraft guns developed in range and accuracy during the progress of the war. Under such conditions, to which must often be added unfavorable weather, accurate observation was often impossible. Still, with all these handicaps the aerial service justified itself as a valuable observation arm of the service.

At sea also its value was demonstrated. The seaplane soaring in the air could detect the wake of a submarine more readily than it could be seen from the deck of a vessel. The "mother ship," on which the seaplane could descend,

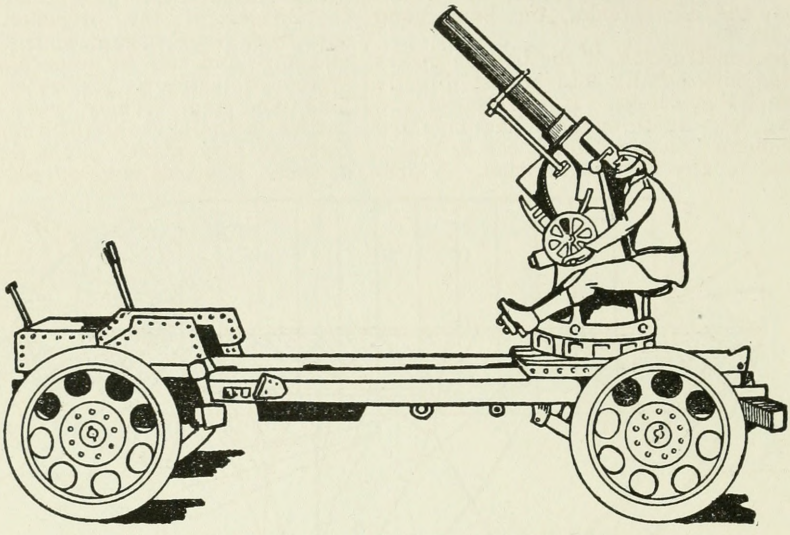
from which it could rise, and where it could receive repairs and supplies, enabled them to operate a long distance off the coast and made them the "eyes of the fleet." They could give warning of the approach of a hostile squadron long before it hove in view. They could announce to France and England, as they frequently did, the coming of raiding Zeppelins and airplanes.

For photographic work, the airplane proved invaluable. The camera was truthful and never in a hurry. What the airman's eyes frequently could not see was recorded by the camera, to be carefully deciphered at headquarters later on. In this way, trenches and fortifications could be clearly traced, and operations could be intelligently based upon these records.

At first the airplane was chiefly relied on by both sides for an aid to the artillery in directing its fire. But gradually it fell into disuse for this purpose. The height at which it had to fly made its directions often inaccurate and then too the increasedly skillful use of camouflage in concealing the gun locations of the enemy thwarted the observer's efforts.

Gradually this use of the airplane was discarded, and the kite balloon took its place. The work of the observer stationed in the balloon was less spectacular than that of the aviator, but far more accurate, and in many respects more important. His work was not marred by haste. He had powerful glasses that gave him a radius of 10 miles. He had time to study a suspicious thicket or clump of trees, and see whether it really marked a concealed gun position. He could keep constantly in touch with his batteries by telephone.

To be sure, his work was extremely hazardous. But he had to be a fatalist and remain quietly in his position. His balloon offered an alluring target for the enemy's long-range guns. Hostile aviators swooped down at the great bag and sought to puncture it with bullets. If an incendiary bullet penetrated the fabric and ignited the hydrogen gas, the balloon was doomed. Not more than 15 or 20 seconds would elapse before the explosion came. The observer's only salvation then was the parachute with which each was equipped. In the 17 days before the armistice was signed, the American army alone lost 21 balloons in this way, but in return our own aviators and artillery brought down 50 German balloons in the same period.



A THREE-INCH ANTI-AIRCRAFT GUN, MOUNTED ON A TRUCK

When the war began, the Germans had about 100 kite balloons of the Drachen type. The Allies had practically none. They set to work, however, and eventually produced the Caquot balloon, which proved to have so many advantages over the Drachen that Germany herself finally adopted it.

The Caquot balloon has a length of 93 feet, while its largest diameter is 28 feet. It has a capacity of 37,500 cubic feet of hydrogen gas, and this proves sufficient to lift the mooring cable, the basket, two observers and all necessary equipment to a height, if desired, of

5,000 feet. The lines are so curved as to offer the least possible resistance to the air. It is made of rubberized cotton cloth. It has lobes of rubberized fabric to act as rudders. When the wind blows, the lobes, which are attached to the rear third of the balloon, fill with wind. When the air is calm, the lobes hang loosely.

The construction of the balloon makes it ride horizontally and almost directly above its moorings. It is released and drawn down again by a windlass mounted on a motor truck, so that it can be transported to any desired location. A special feature of the Caquot is the location of the balloonette or air chamber within the main body of the gas bag. To separate it from the gas chamber, a diaphragm of rubberized cotton cloth is used. There is no air in the balloonette when it is first fully inflated at what is practically the ground level, but as the balloon ascends the wind blows into the balloonette through a scoop placed under the nose of the balloon. This forces up the balloonette and compensates for the inevitable leakage of gas from the envelope.

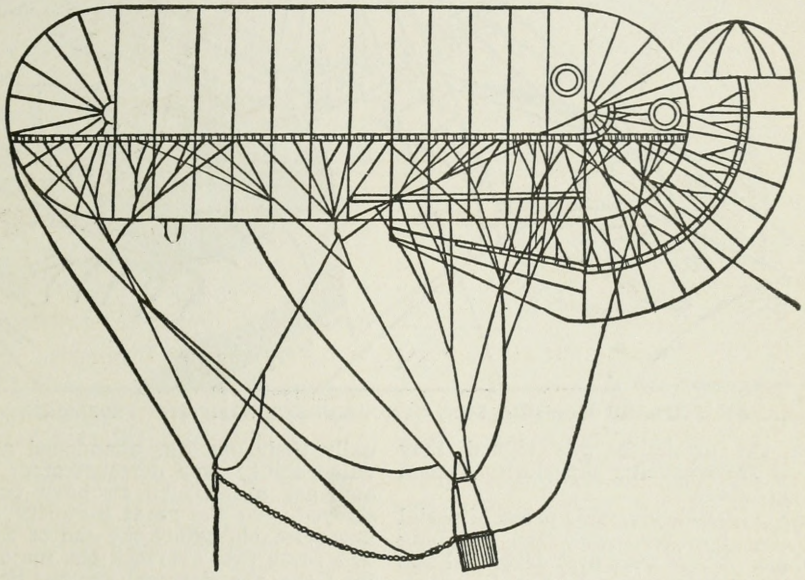
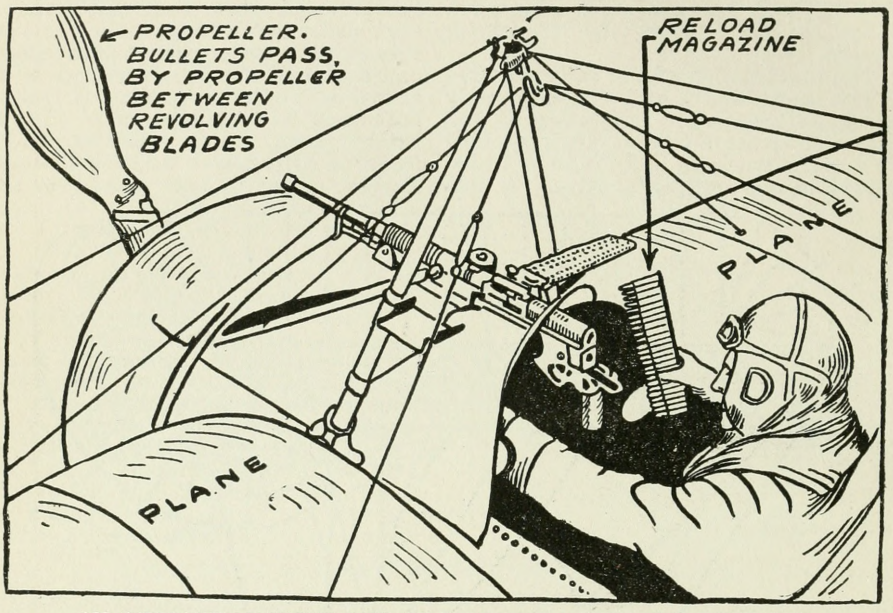


DIAGRAM OF A KITE OBSERVATION BALLOON, USED IN THE UNITED STATES

The average life of a kite balloon on an active war front was only fifteen days, but it did valuable work while it lasted. So anxious were the Germans to destroy them that they gave an aviator who brought one down a credit equivalent to the one bestowed for 1½ planes destroyed.

The scouting plane and the kite balloon represent the defensive feature of aviation. But it was soon discovered that the air service could also be made a formidable weapon of offense. Machine guns were furnished that were so synchronized that they shot through the blades of the propeller. Aerial squadrons were organized that wheeled and dove and rose in accordance with a system of tactics as precise as those on land and sea. There were Homeric battles in the sky, in which as many as forty or fifty planes might be engaged at once. Rewards were offered for those who brought down the greatest number of enemy machines and the coveted title of "ace" was bestowed upon the airman who had the attested destruction of five or more planes to his credit. Supremacy in the air was eagerly sought for by both sides, for it meant that one's own planes could hang over the enemy's front and watch his movements, while he was debarred from doing the same thing in return. Planes were constructed with armored protection to ward off the enemy bullets. Sometimes, instead of fighting with aerial competitors, a daring aviator would swoop down near the ground and rain machine-gun bullets on a marching detachment of the foe. The keen rivalry between the aerial enemies stimulated the invention of devices that would increase the effectiveness of the service. Chief among these was the wireless telephone, that enabled the aviator to

keep within speaking radius of his commander in the air and his ground station. At the beginning of the war, aerial supremacy resided with the Germans, but as the conflict progressed it gradually swung to the side of the Allies, so that



AN AIRPLANE MACHINE GUN, SYNCHRONIZED WITH THE PROPELLER

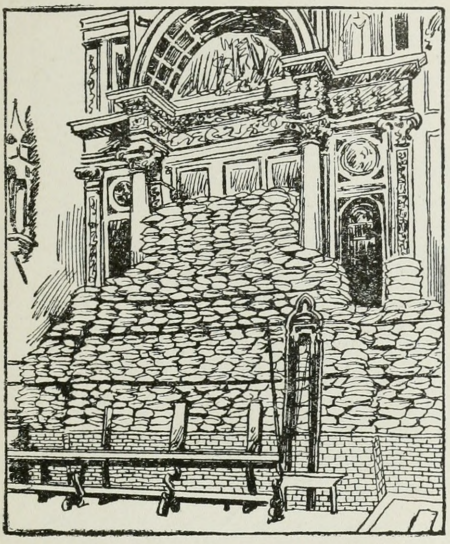
when the armistice was signed they had an overwhelming superiority in men and machines.

Far overshadowing this phase of aerial warfare, however, was the bombing machine. These were first developed and used on a large scale by the Germans. The dropping of bombs on fortified places came well within the spirit of the articles of war. But Germany went further and dropped them upon the helpless civilian population of Paris, London, and other cities. The claim that these were fortified towns in the accepted meaning of the word was merely a pretext. Not even hospitals were spared in the savage warfare she adopted. The design was not merely to inflict a certain number of casualties, which after all could not be considerable, compared with the whole population, but shake the nerves and weaken the morale of the people back of the firing line. How greatly they failed of this effect is now a matter of history. At first, Germany relied for this work chiefly on her Zeppelins, of which more than a hundred were constructed during the war. But these giant dirigibles proved unsatisfactory. They were too unwieldy, were largely at the mercy of wind and weather, and offered too great a target for anti-aircraft guns and the hosts of planes that rose in the air like a swarm of wasps to attack the huge craft with bombs and incendiary bullets. Gradually their use was abandoned as their vulnerability was demonstrated. Thirty at least are known to have been destroyed, and the great majority became unserviceable before the end of the war. The same fate overtook the majority of the Gross, the Parseval, and the Schuette-Lanz types of dirigibles.

The bombing planes which replaced them had manifest advantages over their predecessors. They were speedy, less liable to be sighted by the enemy, and large enough to carry a heavy complement of bombs. Their military value was enormous in breaking up enemy bases and depots and preventing the concentration of troops. During eight days of the German drive in 1918, French airmen dropped 317 tons of bombs in the German lines, and produced a demoralization that greatly increased the effectiveness of Foch's counter-offensive.

Airplane bombs are constructed with great care, and so shaped that they offer the least possible resistance to the air. They have fins on their tails to assure a perpendicular fall. They are carried on the planes either suspended under the wings or fuselage of the planes or car-

ried in the fuselage itself. A special mechanism is employed to release them at the will of the aviator. He can release one or many at a time, according to whether he wants a salvo or just a



SANDBAG PROTECTION AGAINST AIR RAIDS

"trail fire." A small lever in the fuselage effects the release. Care must be exercised to release them alternately when they are carried beneath the wings so as not to disturb too much the equilibrium of the machine. He can drop them so as to explode or not, for sometimes an occasion arises when he must unload over his own lines.

There are three distinct types of bombs — demolition, incendiary, and fragmentation. The demolition bombs have a light steel shell, and are filled with T. N. T. or some other explosive of great destructive power. They are used against heavy structures like depots, railways, and ammunition dumps. The charge is set off by a detonator, separated from the contents of the bomb by a pin. When the bomb is released, the pin is pulled out automatically, and the detonator slides into position to explode the bomb the instant it strikes. Some of the demolition bombs weigh a thousand pounds and carry five hundred and seventy pounds of explosive.

Fragmentation bombs are designed on explosion to scatter showers of fragments. They carry smaller charges, because their walls are thicker. They are designed to be used against troops and are timed to explode when but a few inches above the ground. The timing mechanism has to have an accuracy of less than a thousandth of a second.

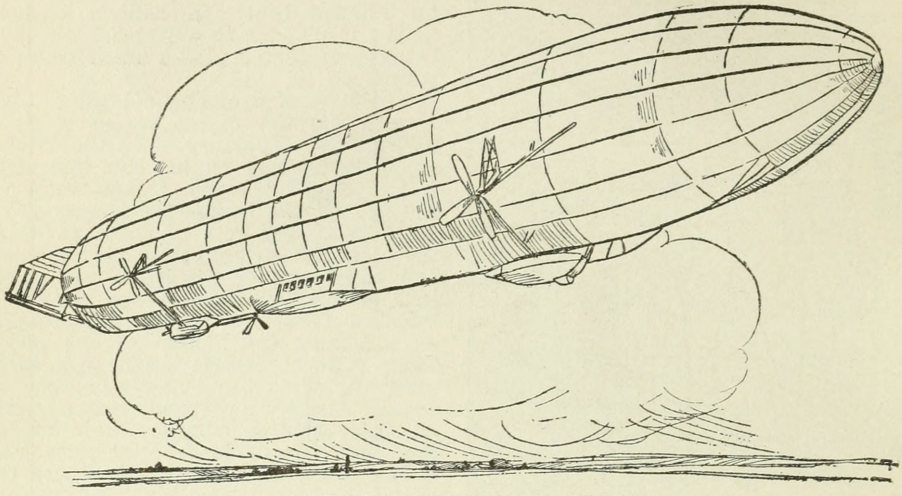
Incendiary bombs are intended to set fire to inflammable structures. They weigh about 40 pounds and contain a combination of chemicals that develops an intense heat. A sodium element makes it difficult to extinguish the fire, because sodium explodes when water is poured on it.

The task of dropping a bomb so that it will hit the object aimed at is a difficult one, especially when the aviator relies exclusively on his own judgment and eyesight. Many things influence the fall of the bomb—the height above the ground, the rate of speed at which the plane is traveling, the air currents, and the shape of the bomb. It moves in a parabolic curve. When it is first released it moves almost horizontally, as it shares the motion of the plane. Then gravity asserts itself, the bomb gradually curves, and as the velocity increases assumes a perpendicular position. All this requires expert calculation, as the bomb has to be dropped some time before the aviator is directly above the object he desires to hit. To remedy miscalculations, sights were adjusted to the height, speed, and other conditions. When the two sighting points came in line with the target, the aviator could release his bomb with the probability that an accurate hit would be registered.

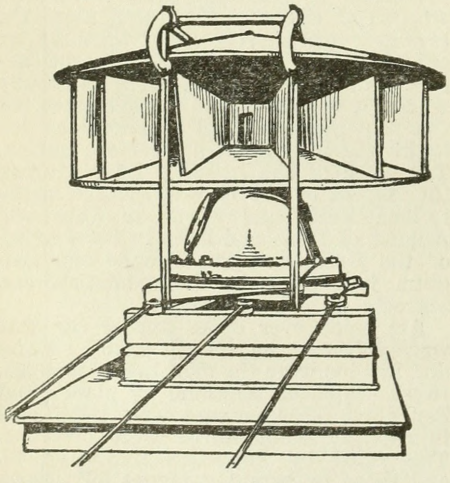
When by these improvements the bombing plane had been practically perfected, it proved a most formidable weapon of offense. More and more the armies came to rely upon them as an effective and almost indispensable adjunct in large operations. Especially when the enemy was in retreat, were the bombing planes useful in harassing his flight and increasing his demoralization. The work of the Allied aviators during the retreat of the Crown Prince's army to the Vesle and Aisne in July and August of 1918, and later in the driving of the Germans from France and Belgium just prior to the armistice, can scarcely be overestimated.

Air raids over cities during the war were initiated by the Germans. Paris and London were the principal objectives. In the raids on England by planes and Zeppelins, 5,511 persons were killed and injured, of whom 4,750 were civilians. The raids by Zeppelins numbered 51 and those by bombing planes 59. Paris suffered to a lesser degree, but still heavily. An incidental feature of one of the Paris raids was the suffocation of about three-score people who had taken refuge in a subway tube.

The destructive power of the air raids was steadily lessened, however, as defensive measures were adopted and perfected. Airplane squadrons were kept in reserve at London and Paris, ready to ascend aloft at an instant's notice to repel the invaders. Anti-aircraft guns of great range and accuracy brought down both Zeppelins and planes. Searchlights of enormous candle power swept the skies at night in every direction. Sirens were stationed on the tops of buildings so that their shrill warnings might prompt the population to seek shelter. Bells and whistles were used for the same purpose. Underground passages were constructed at various points, to which the people flocked when the alarm was given. By these measures of precaution the casualties were sensibly lessened.



A ZEPPELIN DIRIGIBLE AIRSHIP

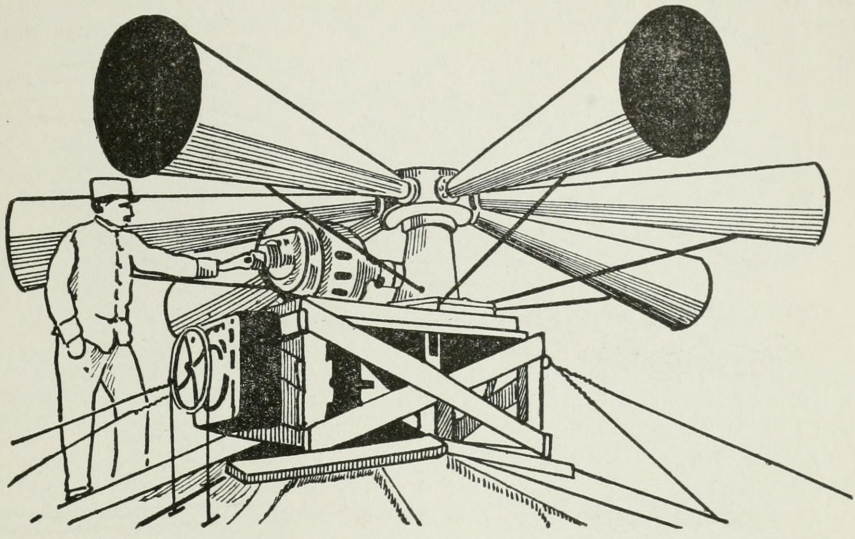


A SIREN, USED TO WARN OF ENEMY AIR RAIDS

The Allies for a long time were unwilling to retaliate in kind. But later, as in the case of asphyxiating gases, they were forced in self-defense to adopt the same methods as the enemy, although they never attacked hospitals, as the Germans did repeatedly through the war. It was some time however before the bombing operations of the Allies rivaled those of Germany in effectiveness. The latter had organized their service to a high point of efficiency. They employed two types of planes, triplanes equipped with machine guns and automatic bomb throwers; the Gothas with two Mercedes engines of 260 horse power each and carrying 1,200 pounds of explosives, with gasoline sufficient for a five hours' flight, and the Friedrichshafens, with two Benz motors of 225 horse power each and carrying half a ton of bombs and gasoline supplies for four hours.

By the summer of 1918, the Allies had perfected bombing planes that rivaled those of the Germans in size and power and greatly exceeded them in number. They then began a system of reprisals over the cities of the Rhine valleys, selecting as their targets munition factories, railway sidings, barracks, and steel works. Despite their efforts to limit their targets, much damage was done inevitably to civilian property and considerable loss of life resulted in Coblenz, Düsseldorf, Cologne,

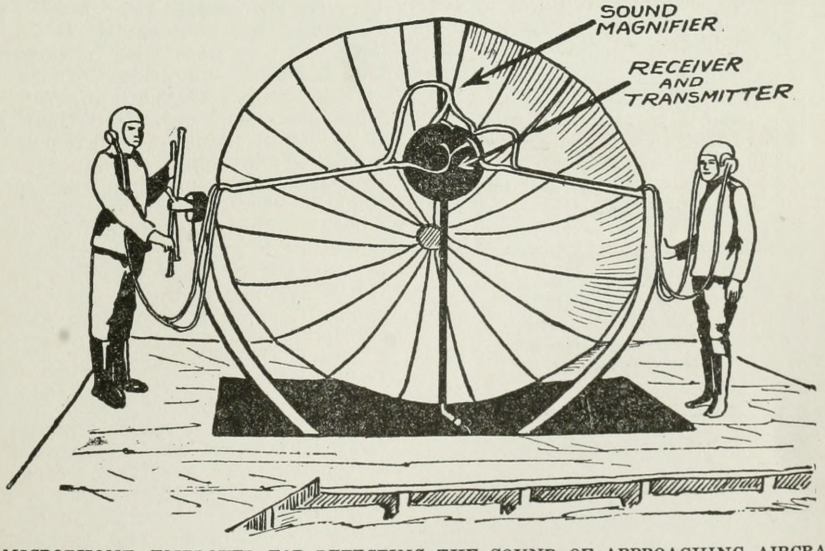
and other cities. In a three months' period, 249 raids were made and 247 tons of bombs dropped. So heavy was



A FRENCH ELECTRIC SIREN USED TO GIVE THE ALARM FOR AN AIR RAID OF THE ENEMY

the damage inflicted that the German Government on Nov. 4 appealed to the American Government, and proposed the abandonment by both sides of attacks

airplanes. Propaganda was also scattered over the enemy's lines. Millions of pamphlets and leaflets fluttered down into enemy trenches, and told to the soldiers there the views of the other side and the course that operations were taking. This was done by both sides,



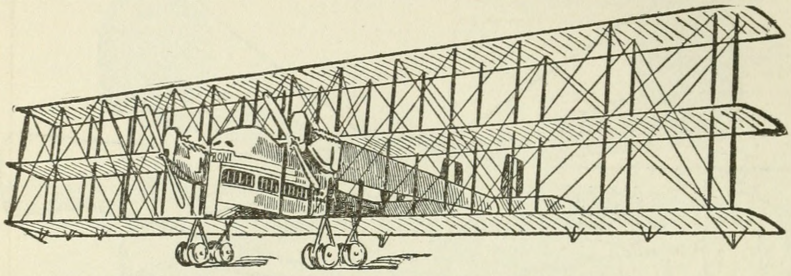
A MICROPHONE, EMPLOYED FOR DETECTING THE SOUND OF APPROACHING AIRCRAFT AT NIGHT, OR BEFORE THEY COME INTO VISION

on cities outside of the fighting zone. What it had itself originated was proving its undoing.

Not only bombs were dropped from

and in the later days of the war proved especially useful to the Allies, as was proved by the bitterness of Hindenburg's complaint of the demoralization

thus produced among his troops. Earlier than this, the Italian poet-aviator d'Annunzio had flown over the Alps to Vienna and circled over that city,



A TWENTY-PASSENGER CAPRONI TRIPLANE

dropping pamphlets which told the Viennese that he could just as easily have dropped bombs and urged them to withdraw from a hopeless conflict.

AËROTHERAPEUTICS, the method of treating diseases by employing various degrees of atmospheric pressure upon diseased persons. The effect is sometimes produced by changing the composition of the air. Tuberculosis of the lungs is most frequently treated in this method, although it is employed likewise in pneumonia and other pulmonary diseases.

AERSCHOT, a town of Belgium on the river Demer, 20 miles N. E. of Brussels and important as a railway center and for its cloth manufactures. Its population at the outbreak of the World War was about 8,000. In the first month of the World War the Germans entered the place and took possession. It was claimed by the Germans that one of their officers was shot by a boy, the son of the burgomaster. A reign of terror set in that lasted three days. 150 inhabitants are alleged to have been shot. Cardinal Mercier stated that he knew of his own knowledge that 91 at least were killed. Others of the inhabitants were taken as prisoners, first to Louvain, and then into Germany.

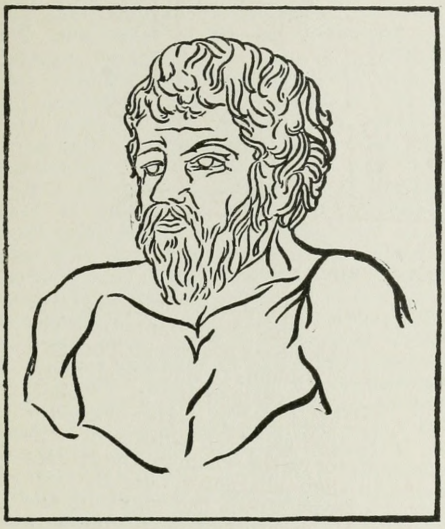
ÆSCHINES (es'ke-nēz), a great Athenian orator (389-314 B. C.), rival of Demosthenes. Only three of his "Orations" have come down to our time. He was especially brilliant in his extemporaneous efforts. In his more studied orations, his great merit was the clearness and fullness of the narrative part.

ÆSCHYLUS (es'kil-us), the father of the Athenian drama. He was in the sea fight at Salamis, and received a wound in the battle of Marathon. His most solid fame, however, rests on his power as a tragic poet. Of 90 plays produced by him, 40 were rewarded with the public prize, but only seven have come down to us, though the titles of 72 others are known to us. The seven tragedies still extant are: "The Suppliants"; "The Persians"; "The Seven against Thebes"; "Prometheus Bound"; and a trilogy, "Oresteia" ("Agamemnon"; "Choëphori"; "Eumenides"). He was the first to introduce two actors on the stage, and to clothe them with dresses suitable to their character. He likewise removed murder from the sight of the audience. He decorated the theater with the best paintings of his time, and the ancient, like the modern stage, exhibited temples, sepulchres, armies, fleets, flying cars, and apparitions. He mounted the actors on stilts, and gave them masks to augment the natural sounds of their voices. He was born in Eleusis about 525 B. C. and died in Sicily about 455 B. C. His imagination was strong, but wild, vast in its conception, but greatly dealing in improbabilities. The obscurity of his style is admitted.

ÆSCULAPIUS (es-kū-lā'pē-us), the god of medicine, son of Apollo and the nymph Coronis. Apollo brought his son to Chiron, who instructed him in medicine and hunting. In the former, he acquired a high degree of skill, so as to surpass even the fame of his teacher. He not only prevented the death of the living, but even recalled the dead to life. Jupiter, however, induced by the complaints of his brother, Pluto, slew Æsculapius with a thunderbolt. After his death, he received divine honors. Æsculapius is represented with a large beard, holding a knotty staff, round which was entwined a serpent, the symbol of convalescence. Near him stands the cock, the symbol of watchfulness. He is sometimes crowned with the laurel of Apollo. Sometimes also Æsculapius is represented under the image of a serpent only.

ÆSIR, the gods of the Northmen of Scandinavia and Iceland.

ÆSOP (ē′sop), a Greek fabulist, who lived in the 7th century B. C. According to tradition, he was a captive of war, and for a part of his life a slave. Many of his fables have been traced to Egyptian and Indian sources. Socrates, during his



ÆSOP

imprisonment, put into verse a portion of the Æsopian fables.

ÆSTHETICS or **ESTHETICS**, the science which treats of the beautiful and the pleasing. The term was first used in its present sense by Wolf, about the middle of the 18th century. According to Herbert Spencer, one characteristic of æsthetic feelings is that they are separated from the functions requisite to sustain life, and it is not till the latter have had proper scope accorded them that the former gain power enough to act. The delight in painting, music, sculpture, poetry, and the drama is æsthetic; and the science investigates the origin of such sensations, the laws which characterize them, and the excellent effects which, when they are not abused, result from their operation to humanity.

ÆSTIVATION, in botany, a term used of the manner in which the parts of a blossom are arranged within a flower bud before the opening of the latter. It is more rarely called prefloration. The word æstivation is separately applied to the calyx, the corolla, the stamens, and the pistil, but not to the flower in general.

ÆTNA. See ETNA.

ÆTOLIA (ē-tō′lē-a), a district of ancient Greece, lying on the N. coast of the Gulf of Corinth. The country had few cities; was, except on the coast, generally wild and barren. Here, according to the legend, Meleager slew the Calydonian boar. The Ætolians make a great figure in the heroic age of Greece; but, at the time of the Peloponnesian War, they were rude and barbarous. The Ætolian confederacy, first called into existence about 323 B. C., became an important rival to the Achæan League. Their assembly was styled the Panætolicon. They were subjugated by the Romans in 189 B. C. Along with Acarnania, Ætolia now forms a department of the modern kingdom of Greece, with a united area of over 3,000 square miles. The chief towns are Missolonghi and Lepanto.

AFFIDAVIT, a voluntary affirmation or solemn declaration, sworn to before a person at liberty to administer an oath. The affidavit must give the name and address of the person stating the facts within his own cognizance, and the exact sources from which other facts are drawn.

AFFINITY. (1) Neighborhood; (2) relationship by marriage; (3) union, connection.

In ordinary language and law, literally, the relationship contracted by marriage between a husband and his wife's kindred, or between a wife and her husband's kindred. It is opposed to consanguinity, or natural relationship by blood. It is of three kinds: (1) Direct, viz., that subsisting between a husband and his wife's blood relations, and *vice versa;* (2) secondary, or that which subsists between a husband and his wife's relations by marriage; and (3) collateral, or that which subsists between a husband and the relations of his wife's relations.

In biology, a resemblance, or resemblances, on essential points of structure, between species, genera, orders, classes, etc., really akin to each other, and which should be placed side by side in any natural system of classification. Affinity differs from analogy, the latter term being applied to resemblances between animals or plants not really akin, but which ought to be more or less widely separated in classifications. Thus the falcons, the hawks, the eagles, etc., are related to each other by genuine affinity; but the similarity on certain points, such as the possession of retractile claws, between the raptorial birds and the feline race of mammals, is one only of analogy.

In chemistry, chemical affinity, or chemical attraction, is the force by which union takes place between two or more elements to form a chemical compound.

According to another definition, it is a force exerted between two or more bodies at an infinitely minute distance apart, by which they give rise to a new substance, having different properties to those of its component parts. Elements have the greatest affinity for other elements which differ most in their chemical properties. Thus, H has great affinity for Cl and O, but the affinity between O and Cl is much weaker. Acids unite readily with alkalies; most metals, with sulphur. A strong acid generally expels a weaker one. But when two salts are fused, if a more volatile compound is formed, it is driven off. The relative affinities between different substances varies with their temperature, insolubility, and power of vaporization. Alternation of temperature alters the affinity; thus, mercury heated to its boiling-point absorbs oxygen, which it liberates at a higher temperature.

Affinity of solution is such an affinity as exists between a soluble salt and the fluid in which it is dissolved. Till the liquid is saturated with the salt, the two can combine in an indefinite ratio, instead of being limited to the fixed proportions in which alone chemical affinity operates.

AFFIRMATION, the act of affirming, in the sense of solemnly declaring in a court of law that certain testimony about to be given is true. Also, the statement made. First, the Quakers and Moravians, who objected on conscientious grounds, to take oaths, were allowed to make solemn affirmations instead; now, everyone objecting to take an oath has the same privilege; but, as is just, false affirmations, no less than false oaths, are liable to the penalties of perjury.

AFGHANISTAN, an inland country of Asia, bounded on the W. by Persia, on the S. by British Baluchistan, on the E. by territory under British influence (determined 1893-1895), and on the N. by Russian Central Asia. Its area is about 250,000 square miles, or about twice the size of Great Britain and Ireland. The country, called Urlayat by its inhabitants, consists of elevated table-lands, diversified by mountains, and there is a great variety of climate. At Ghazni the winter is extremely rigorous; the climate of Seistan, in the S. W., is hot and trying; while, in other parts, it is temperate. The country may be divided into the five provinces of Kabul (Cabul), Herat, Ghazni, Seistan, and Kandahar. To the N. lie the still disputed regions of Turkestan and Badachshan, with their dependencies. Each province is ruled by a governor, under whom the nobles and kazis (magistrates), assisted by muftis, administer justice after a feudal fashion. The monarch of the whole country is styled the Ameer.

The population of Afghanistan is composed of a variety of nationalities, and is estimated at about 6,380,000. The Afghans proper, or Pathans, number about 3,000,000, and are divided into tribes, or clans—Duránis, Ghilzánis, Yúsufzáis, and others. In religion, they are Sunni-Mohammedans. In character, they are proud, vain, cruel, perfidious, extremely avaricious, revengeful, selfish, merciless, and idle. "Nothing is finer than their physique or worse than their *morale*." The Afghans do not, as a rule, inhabit towns, except in the case of those attached to the court and heads of tribes. The townsmen are mostly Hindkis and other non-Afghan races, who practice various trades and handicrafts considered derogatory by men of rank. The principal towns are Kabul (pop. about 150,000), the seat of government, and center of a fertile district; Ghazni, a strong fortress; Kandahar, the chief city of southern Afghanistan, with about 30,000 inhabitants; and Herat, formerly considered the key of India. Among the natural productions of Afghanistan is the plant yielding the asafœtida. The castor oil plant is everywhere common, and good tobacco is grown in the district of Kandahar. The cultivated area round Herat produces magnificent crops of wheat, barley, cotton, grapes, melons, and the mulberry tree. In special localities are forests of pistachio. The industrial products are silk, chiefly for domestic use, and carpets, those of Herat being of admirable quality. The manufacture of *postins*, or sheepskins, is one of the most important occupations.

History.—The history of Afghanistan, as an independent state, only dates from the middle of the 18th century. For two centuries before, Herat and Kandahar had been in the possession of Persia; while Kabul was included in the mogul empire of Delhi. Upon the death of Nadir Shah, in 1747, Ahmed Shah Durání subjugated the different provinces, and, when he died in 1773, left an empire to his son, Timur Shah. The chief events in the history of Afghanistan are the expedition, in 1839, which established Shah Soojah on the throne; the rebellion of 1841, in which the Residents, Burnes and Macnaghten, were killed and the Anglo-Indian troops perished in the retreat; the punitive expedition, in 1842; the defeat of Dost Mohammed, in 1849; the war with Shere Ali, in 1878-1879, and installment of Yakub Khan; the rising

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ANGOLA
FRENCH WEST AFRICA
NIGERIA
SUDAN
MOROCCO
ALGERIA
TRIPOLITANIA
CAIRO
Mandate of Union of South Africa
Mandate of France
CAPE TOWN
Port Elizabeth
Same scale as main map

at Kabul and murder of Cavagnari, the English Resident; the punitive expedition under Roberts; the establishment, by British assistance, of Abd-ur-Rahman as Ameer, and the constantly recurring alarms as to encroachments on the part of Russia. The yearly pension granted the Ameer by the Indian Government was raised to 18 lacs of rupees. Moreover, the Indian Government yielded all its claims on Kafaristan. The result of this was that, in 1895, the Ameer's troops thoroughly devastated the land of these brave mountaineers. Abd-ur-Rahman, by means of his shrewd policy and decisive measures, succeeded in suppressing all insurrections and strengthening his power. In regard to the insurrection that broke out between the tribes of the Afridi and the Orakzai, on the Indian-Afghanistan frontier, he remained neutral.

Abd-ur-Rahman died Oct. 1, 1901, and was succeeded by Habib-Ullah Khan. The treaty with Great Britain was renewed, and by a compact drawn up in 1907 the latter country acknowledged Afghanistan's independence. In 1910 it was agreed that all disputes between Afghanistan and the Indian Government should be left to a joint commission. Relations were not cordial, however, and in 1919, after Habib-Ullah had been assassinated while sleeping in his tent, war broke out between the Afghans and the British. It was, however, of short duration, although some of the fighting was severe, and resulted in a triumph for the British arms. A treaty of peace was signed Aug. 8, 1919, one of the provisions of which was that Afghanistan should have entire freedom in its foreign relations. This was taken advantage of shortly afterward by the Afghans, who sent an embassy to the Soviet Russian Government at Moscow, where it was received with great consideration and met with an offer of alliance. Despite the peace treaty with the British, two Afghan tribes, the Waziris and Mahsuds, continued outpost actions on the frontier and at the beginning of 1920 had not been entirely subdued. The present Ameer is Amanullah Khan, the third son of Habib-Ullah Khan, whom he succeeded in 1919.

AFRICA, the name given to the continent lying S. of the Mediterranean; probably derived from the Punic *Afrygah*, a colony, with reference to Carthage, a Phœnician colony. Excepting Asia, Africa is the largest grand division of the world, being three times as large as Europe, and containing one-fifth of all the dry land on the globe. On the N. it is bounded by the Mediterranean, which separates it from Europe; on the S., by the Southern Ocean; on the E., by the Isthmus of Suez, the Red Sea, and the Indian Ocean; and on the W. by the Atlantic.

Physical Features. — Its greatest length is nearly 5,000 miles; its breath, about 4,700 miles, and its area about 11,500,000 square miles. Since 1869, by the construction of the Suez canal, Africa has been an island.

Its coast line is reckoned at more than 20,000 miles, and is marked by few indentations, and is generally characterized by narrow strips of lowlands. The surface is fairly well defined, as consisting of two divisions, the northern table lands of the Sahara, part of which is below sea-level, and the central and southern plateaus, broken only by the valley of the Zambezi, beginning in north Abyssinia and extending S. as far as Cape Colony, with an average height of 4,000 feet. In Abyssinia is the main mass of mountains, reaching a maximum height of 15,000 feet. South of the equator are the extinct volcanoes Kilimanjaro (nearly 20,000 feet), and Kenia (18,500 feet), and the Drakenberg mountains of subtropical Africa (11,000). Other ranges of moutains are the Atlas, in Barbary, and the Kameruns, both reaching a maximum of 12,000 feet in height. On the borders of the Kongo Free State and the British and German spheres of influence, there is a line of active volcanoes, one of which, Mfumbiro, reaches 10,000 feet. In the southern plateaus are a number of fresh water lakes, Victoria Nyanza, Tanganyika, Bangweolo, and Nyassa. The first of these, which has an area of 30,000 square miles, is the source of the Nile. Lake Tanganyika, with an area of 16,000 square miles, is the source of the Kongo. Lake Tchad receives the waters of a basin in the central Sudan. Near Tajara, on the Red Sea, is Assal, a salt lake, 750 feet below sea-level. The Nile is the largest river of Africa (3,766 miles long), but the Kongo, 3,000 miles in length drains the larger area of 1,200,000 square miles. Other important rivers are the Niger; the Zambezi, with its great falls; the Shari, emptying into Lake Tchad, and the Limpopo. The Nile, the Kongo, and the Niger are great navigable rivers in most of their lower courses. The Zambezi and Limpopo, together with the Rovuma, Juba, and a few other coast streams, flow to the Indian Ocean; all the others, together with the Cunene, Koanza, Ogoway, Volta, Gambia, Tensift, Muluya, and Mejerdah, to the Atlantic, either directly or through

the Mediterranean. The Makua-Welle is a tributary of the Kongo.

Climate.—The rainfall over most of Africa is very scant, with the exception of the W. equatorial area and parts of the S. and S. E. coasts. It reaches 130 inches annually in Monrovia, and varies from 5 inches to nothing in the Sahara and Somaliland.

Fauna.—The continent is rich in animal life, the most common kinds being antelopes, giraffes, zebras, and quaggas. Elephants, once numerous, have been killed for their tusks, and the species has been well-nigh exterminated. Africa is the home of the lion, and the rhinoceros, hippopotamus, crocodile, and hyena are abundant, as are also monkeys and apes, including the gorilla and the chimpanzee. The birds are remarkable for their brilliant plumage, among which the secretary bird, the sun-birds, parrots and bee-eaters are worthy of notice. The ostrich of south Africa is the largest of living birds. Of the insect world, the most remarkable is the south African tsetse, whose bite is fatal to horses and cattle. White ants are known as a destructive plague.

Flora.—In vegetation, the date palm, so useful as food in different ways, is the feature of the N., where a large part of the surface consists of treeless, grassy steppes. In the inland plateaus of the S. are numerous forests of heaths and the plants called *Cycadaceæ*. Euphorbias, aloes, and similar plants are abundant.

Productions, Industry, and Trade.—Ivory was the principal product of the continent in the past, and it is still brought to the coast in great quantities. The central regions produce palm oil, palm kernels, caoutchouc, rubber, gums, cloves, sesame seeds, skins, and ebony and other woods. In the S., cattle, hides, wool, and grain are produced. In Liberia, coffee, cocoa, and bananas are grown. The Mediterranean coast supplies wines and olive oil, and Egypt is a large producer of cotton and cottonseed. In most parts of Africa, salt is an active object of internal trade. In the Niger territories and the Guinea coast, several of the tribes manufacture cotton and leather goods. The mineral products of Africa are relatively small, with the exception of diamonds at Kimberley, in Cape Colony, and gold in the Transvaal. Copper is mined in Cape Colony and coal in the late Boer republics.

History.—The history of Africa reaches far back into antiquity. In Egypt, civilization is known to have existed as early as 5000 B. C.; 600 B. C., King Necho sent Phœnician ships on a voyage around Africa. Between 1100-950 B. C. the Phœnicians founded as many as 300 colonies along the W. coast of Morocco. About 470 B. C. the elder Hanno of Carthage went with a fleet to what is now known as Sierra Leone. Herodotus described "Ægypt" and other parts of Africa; Claudius Ptolemæus wrote the most detailed account of the country that has come down to us. The Roman generals penetrated far into the interior through the Sahara, and, in the time of Nero, Roman officers ascended the Nile. The Romans took possession of the whole of north Africa, including Egypt and Nubia. The conquest by the Arabs of the Roman possessions, as well as of Abyssinia, in the 1st century of the Hegira (7th century, A. D.), stimulated the Arab geographers to write about this great continent. Massudi, Ibn Hankal, Obeid el Bekri, who wrote the first geography of the negro country (1067), Ibn Chaldan, Ibn al Wardi, Abulfeda (1273-1332), Leo Africanus (1492-1526), who went to Timbuktu, Ibn Bakuta, who went to Zanzibar, and many others, visited and described Africa. The Church fathers conceived of the central country as a wilderness uninhabitable on account of the heat, and filled with all manner of mystery; but in the 13th and 14th centuries enterprising Italian merchants did much to make known the Nile Valley and Abyssinia; Marino Sanuto, Giovanni Leardo, Fra Mauro and others drew maps of much of north Africa hitherto unknown. In the 15th century the Portuguese explored the W. coast. By 1434 Cape Bojados had been doubled; in 1456 Cadamosto sailed round Cape Verde and reached Gambia; in 1472 São Thomé, Annobón and Principe were discovered. In 1848 Diego São reached the Kongo and sailed nearly 1,500 miles S. of the equator, and, in 1486, reached the Cape of Good Hope. Early in the 18th century excursions were made to the E. coast. After the discovery of America a great impetus was given to the slave trade, which had hitherto been carried on chiefly by the Arabs, and this led to an acquaintance with Senegambia and the Guinea coast.

Exploration.—Not, however, till the latter part of the 18th century was systematic exploration begun, and since then more than 200 explorers have penetrated the unknown continent. In 1763-1768 James Bruce traveled from Massowah through Sennar to Egypt. In 1788 the African Association was founded in London to undertake the exploration of the Niger. In 1795-1797 Mungo Park reached the upper Niger,

but not until 1830 was knowledge of the river completed by the brothers Lander. Its sources were discovered in 1897 by Moustier and Zweifel. In 1830 the French began the conquest of Algeria, and began to colonize it, especially since the Franco-Prussian War, and they have gradually pushed its boundary S. into the Sahara. In 1850-1855, Barth, who was followed by many other travelers, explored the Sudan, especially the neighborhood of Lake Tchad, and reached Timbuktu. Napoleon's expedition had given a great impulse to scientific exploration, which was encouraged later by the khedives and led to the conquest of Nubia and Sennar by Mehemet Ali (1805-1848), and, with the additional object of suppressing the slave trade, to the annexation of the east Sudan by Ismail Pasha (1863-1879). The Nile has been an object of active interest since 1810, when Salt reached its Abyssinian branches. In 1840-1841, Mehemet Ali sent two expeditions to discover the sources of the main river, and, in 1860, Miani reached as far as 3° 34′ N. latitude. Further exploration was from the S. The existence of great lakes in central Africa had been known at Mozambique from an early date, and, attention being called to this fact, led to the discovery, in 1849, of the extinct volcanoes, Kilimanjaro and Kenia, by Rebmann and Krapf respectively.

In 1856 Du Chaillu explored the southern Ogowe, and, in 1864, penetrated into Ashango and discovered the dwarfs of Obongo. In 1858 Burton discovered Lake Tanganyika. In 1858 Lake Victoria Nyanza, then called Ukerewe, was discovered by Speke, who, in 1862, was able to prove that its overflow constituted the origin of the Nile. In 1864 Sir Samuel Baker discovered Lake Albert Nyanza, and later Stanley discovered Lake Albert Edward Nyanza. In 1849-1856 Livingstone discovered Lake Ngami, crossed the Kalahari desert, and returned across Africa from St. Paul de Loanda to the mouth of the Zambezi, being the first to accomplish this feat. In 1859 he discovered the Nyassa and Chilwa lakes. In 1858-1864 he explored the Zambezi and its tributaries; in 1867-1868 he discovered Lakes Mweru and Bangweolo; and, from 1868 to his death in 1873, he investigated Lake Tanganyika and the headwaters of the Kongo. In 1871 he was found by Stanley at Ujiji. The desire to solve the problem of the Kongo basin led to many expeditions, but the final solution was obtained by Stanley in his journey across the continent in 1874-1877; he showed that the origin of the Kongo was to be found in the Lualaba and the Luapula or Chambeze. The latter, he proved, passes through Lake Bangweolo and joins it with Lake Mweru. He also succeeded in strictly defining the sources of the Nile. In 1884-1885 Grenfell proved the identity of the Ubanggi, the principal tributary of the Kongo, with the Makua or Welle, names previously given to its upper course.

Later Discoveries.—In 1893 and 1894 Marchand explored the regions of Great Bassam on the Ivory Coast, directly N. to the junction of the Bagoë and the Niger. In 1890 Marinel, and, in 1891, Bia, reached the S. E. sources of the Kongo in Kantaga. In 1893 Mohun proved the non-existence of Lake Landji. In 1891 and 1894 De la Khétulle explored from Ubangi to Dar Nefertit. In 1891 Crampel and Dybowski were the first Europeans to cross the Kongo Shari watershed. In 1892 and 1893 Maistre succeeded in penetrating from Ubangi to Logoni and Binuë. In 1891 Fourneau, in 1891-1894 Brazza, and in 1895 Clozel, explored the Sanga Mambere, an affluent of the lower Kongo. A number of explorers also have penetrated the equatorial W. coast: Bottego and Grixioni, 1892 and 1893; Prince Ruspoli, 1893 and 1894; Count Hoyos, 1893 and 1894. Donaldson Smith in 1894 and 1895 explored the interior of Somaliland. The highlands between Tana, Sabaki, and Kenia were explored by Pigott, Höhnel, and Chanler. Baumann, Stuhlmann, and Verther crossed the Massai steppe. The expedition of Shele in 1894, of Marenski in 1892, and Bumiller, also gave important information regarding the southern half of the German boundary.

In the first years of the 20th century great progress was made in scientific exploration in Africa. Previous to that time indeed, Marchand traversed the continent from Loanga in French Kongo to Fashoda on the Nile. The Lake Tchad region and the Sahara desert were traversed at the same time by other French explorers. Between 1900 and 1904 Pierre crossed the continent following in General Marchand's route. In 1909 Gautier crossed the Sahara desert from Tuat to the Niger river. German explorers also were active at this period. Dr. Stuhlmann made a study of the region of Victoria Nyanza and Dr. Hans Meyer made the first ascent of Mount Kilimanjaro.

By this time the era of exploration began to be superseded by one of detailed study of the geography of Africa, the ethnology of its people and the variety and quantity of its resources. This work advanced so rapidly that by 1913 the

continent had practically been charted and mapped and the colonization of various portions had been well begun, especially in British and German East Africa. In Rhodesia and other British colonies agriculture and mining were developed on a considerable scale. Railway construction also developed. In 1913 the copper field of Katanga in Belgian Kongo was connected by rail with Capetown, over 2,100 miles to the south. A line from Cairo was extended to Senaar on the Blue Nile, and a branch of the White Nile had been built at El Obeid, the capital of Kordofan. In the Belgian Kongo railroads had been constructed around all the rapids of the upper Kongo. The great lakes, Victoria Nyanza and Tanganyika, were connected by rail with the Indian Ocean, while another railway connected the upper and middle Niger with the sea.

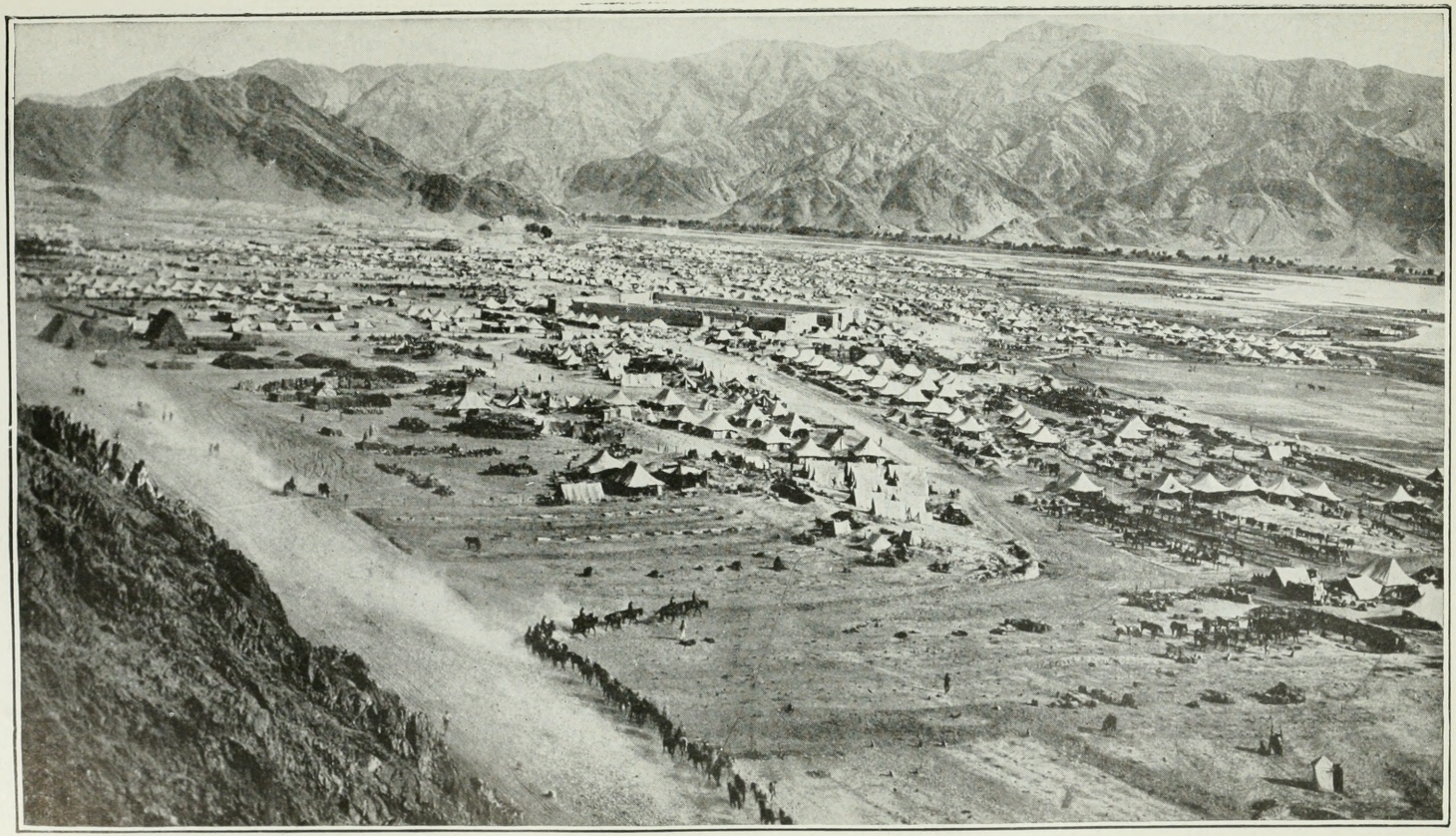
The progress of the World War naturally suspended development and exploration in Africa. In spite of this, however, several important expeditions carried on work during the years 1916 to 1920. Among these was the Collins-Garnier French Kongo Expedition which were working in the interests of the Smithsonian Institution. While the objects of the expedition were largely scientific, many important geographical results were obtained. Another party, also in the interests of the Smithsonian Institution, under the direction of Edmund Heller, carried on explorations in the Cape region and western Rhodesia.

Population.—Recent authorities roughly estimate the population of Africa at about 140,000,000. About 34,000,000, all of Semitic stock, are intruders from Asia, some in remote or prehistoric times (3,000,000 Himyarites in Abyssinia and Harar, from south Arabia), some since the spread of Islam (over 30,000,000 nomad and other Arabs, chiefly along the Mediterranean seaboard, in west Sahara, and central and east Sudan). All the rest, altogether, may be regarded as the true aboriginal element, and as falling into two main groups—the negro and negroid peoples, and the Hamitic.

Communications.—Railroad communication has been greatly developed in recent years. The total length of African railways in 1920 was about 23,000 miles. A railway connects Matadi, on the lower Kongo, to Stanley Pool or Leopoldville. There are steamers plying regularly on the lower Nile, the lower Niger, the Kongo, the Zambezi, the Shire, and on Lake Nyassa.

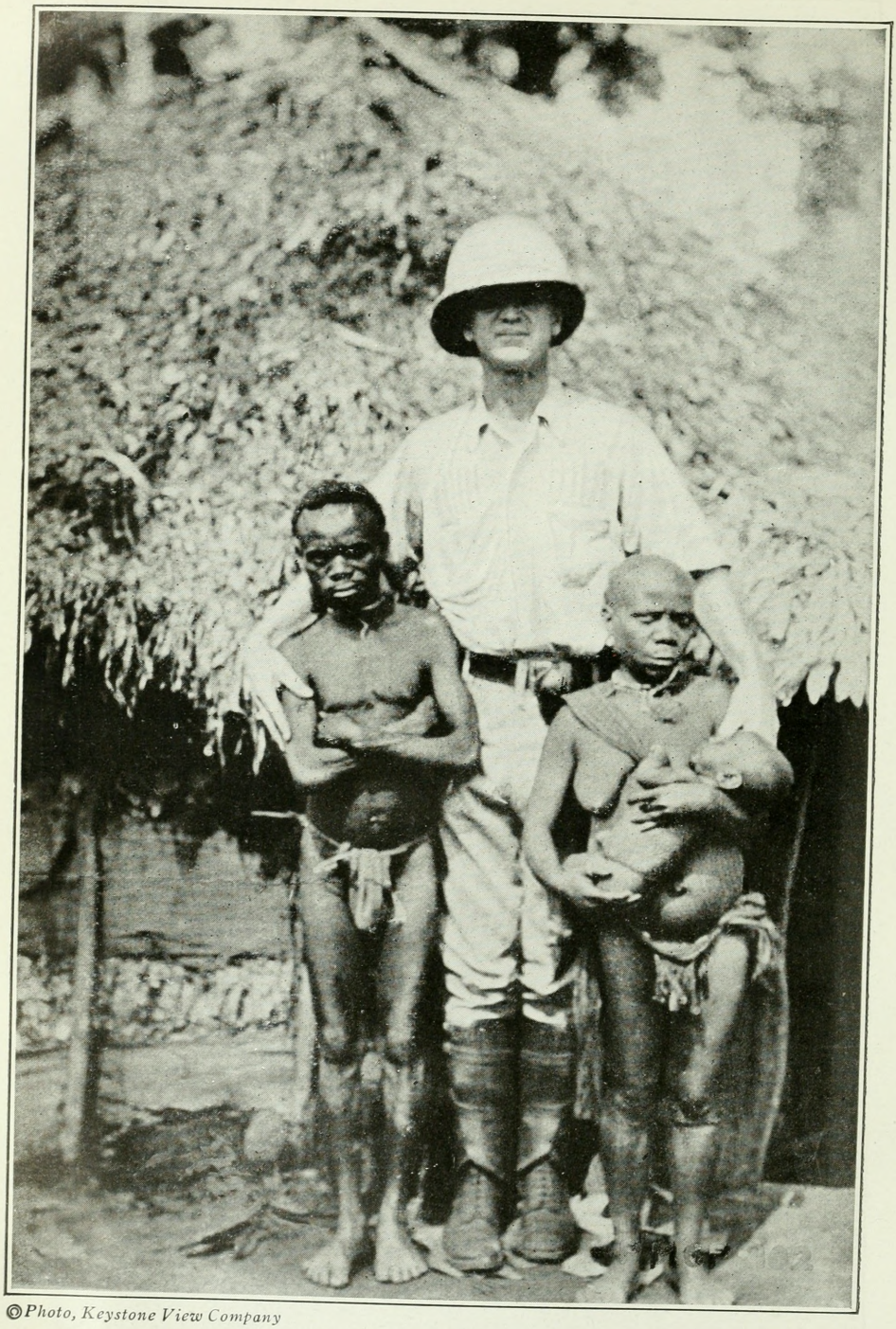
Political Divisions.—The exploration of the Kongo gave rise to the International African Association, founded by King Leopold II. of Belgium in 1876, and the International Association of the Kongo, founded in 1878. These associations organized stations on the Kongo, and, in 1885, an international conference recognized and defined the Independent State of the Kongo (Kongo Free State), of about 1,000,000 square miles in extent. In south Africa the Portuguese settlements, originally founded as early as the time of Diaz and Vasco de Gama, comprise on the E. coast a territory of 260,000 square miles, opposite Madagascar, and on the W. coast an area of 457,500 square miles, from the Kongo to the Cunene river. In 1652 the Dutch sent colonists to the Cape, who were later reinforced by Protestant refugees from France. Cape Colony was finally ceded to Great Britain in 1815 and was afterward colonized from that country. A large part of the Dutch inhabitants, called Boers, migrated, however, inland and founded the two independent republics of the Orange Free State and the South African Republic, or Transvaal. These two states were annexed to the British crown in 1900 as a result of the war.

In 1884 the French annexed a territory N. of the Kongo Free State, 250,000 square miles in extent; and in 1885 an international conference proceeded to delimit the interior portions of the continent. After 1885 the French regarded Madagascar as a French protectorate, but they had much friction with the native Hovas till a French expedition captured the capital, Antananarivo, Sept. 30, 1895, and the protectorate was completely established. In 1885 Great Britain obtained Bechuanaland, with an area of 446,000 square miles, N. of Cape Colony. A large area N. was also annexed, which consists of two portions: (1) The territory of the British South Africa Company, including Mashonaland and Matebeleland, the latter conquered from King Lobengula in 1893, and an area N. of the Zambezi. (2) Nyassaland, in central Africa. The first of these, which has been settled and colonized to a considerable extent, covers 500,000 square miles, and the latter has an area of 210,000 square miles. In 1884 Germany obtained possession of the Kameruns N. of the French Kongo, with an area of 200,000 square miles, and in 1884-1890 the colonies of German Southwest Africa (320,000 square miles), and German East Africa (350,000 square miles), were added. In East Africa Great Britain obtained (1886-1890) the territory of British East Africa, called Ibea, extending from German East Africa to the Webi-Jub



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A BRITISH ENCAMPMENT IN DAKKA, AFGHANISTAN



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AFRICAN PIGMIES DISCOVERED BY EXPLORERS



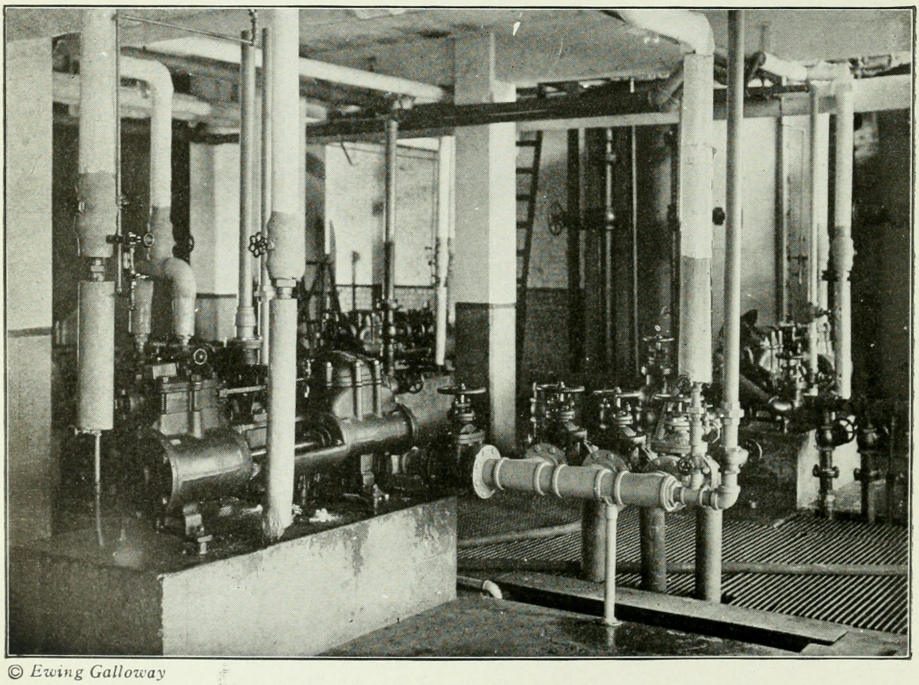
©Photo, Paul Thompson

AFRICAN FIGHTING MEN, READY FOR A RAID



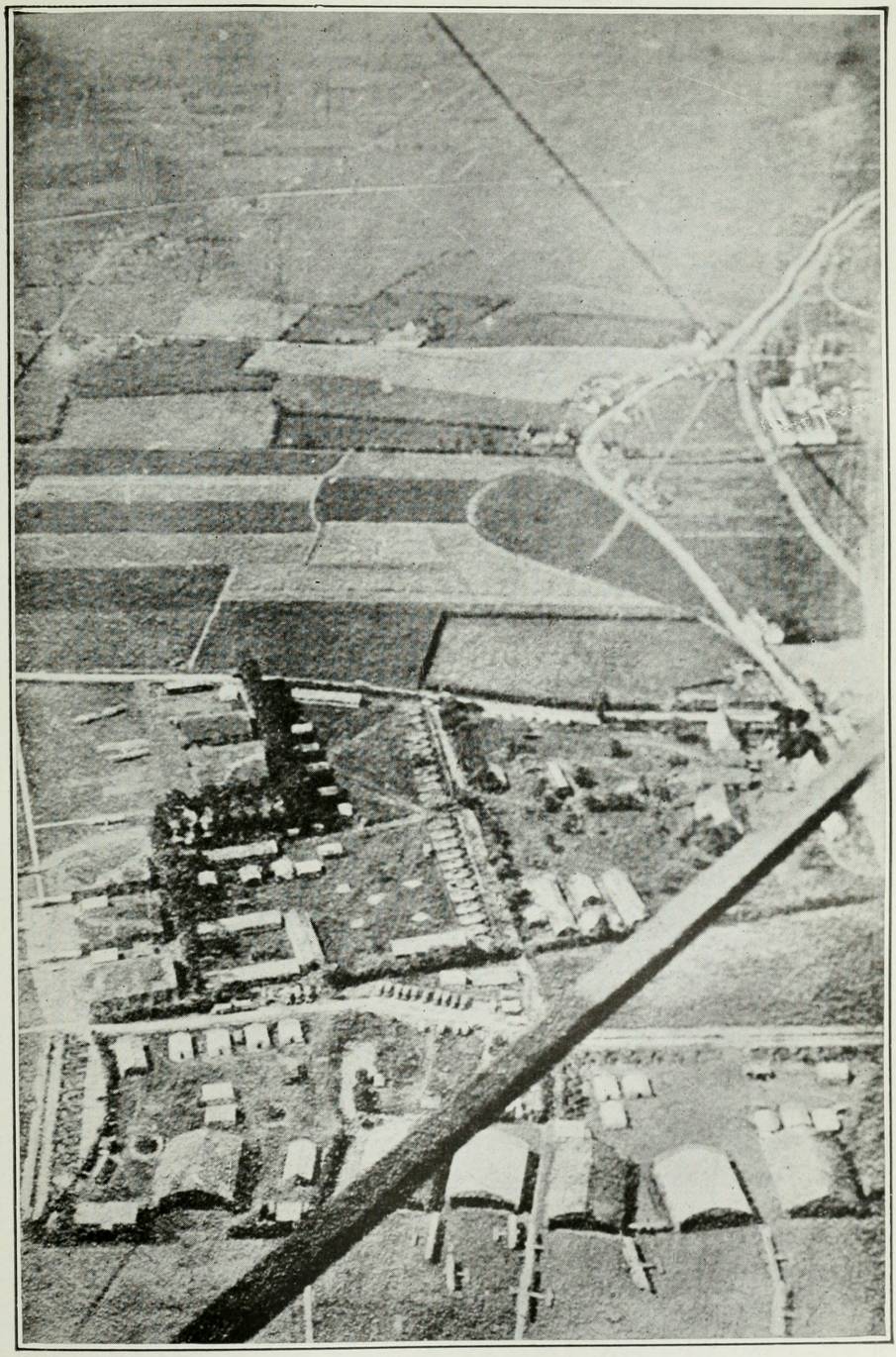
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ACETYLENE WELDING ON PRESSED STEEL



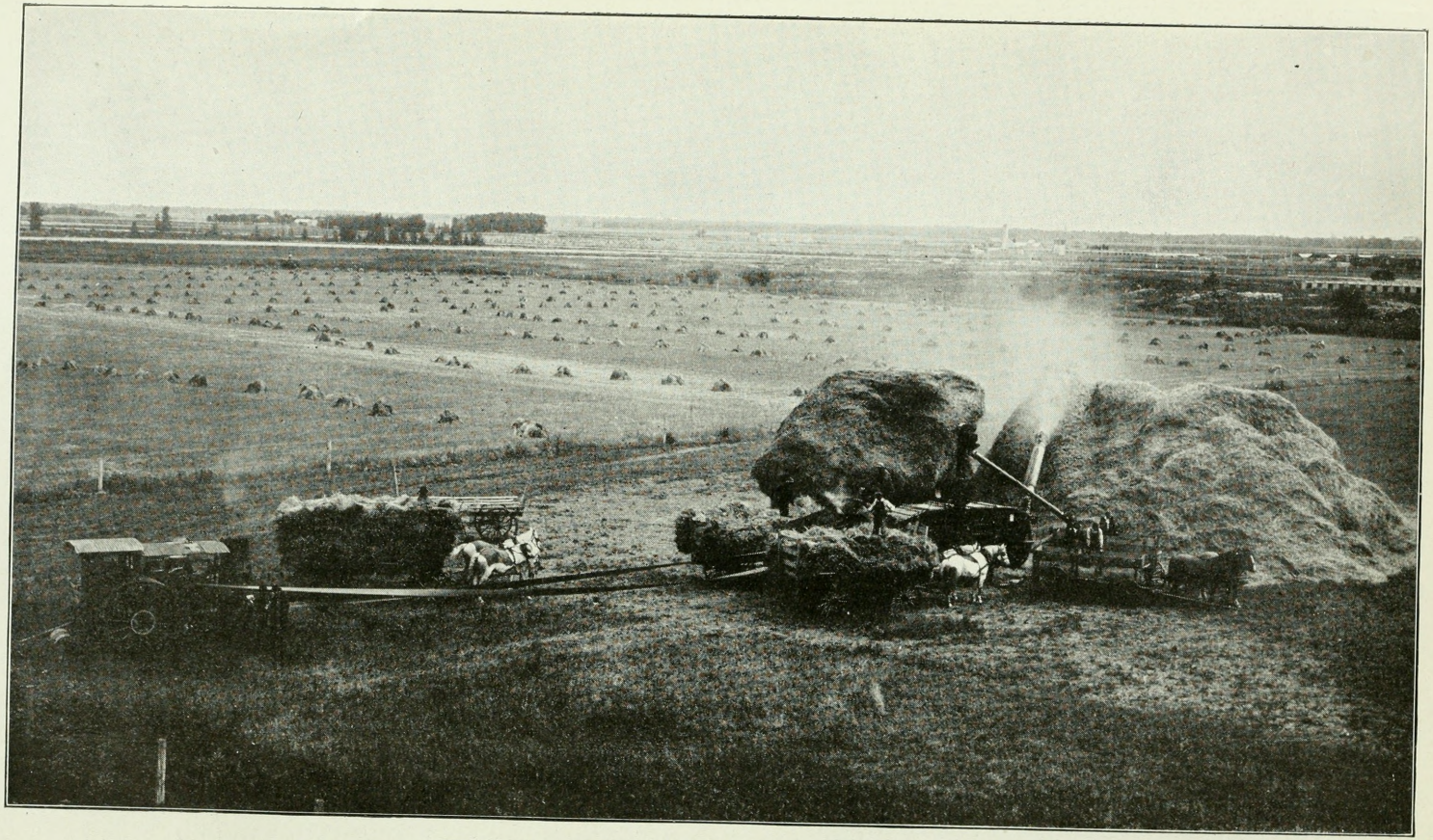
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ASBESTOS-COVERED PIPES IN AN OIL-REFINING PLANT



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AIRDROME, CONSISTING OF ELEVEN HANGARS, CAMOUFLAGED TO APPEAR LIKE TWO

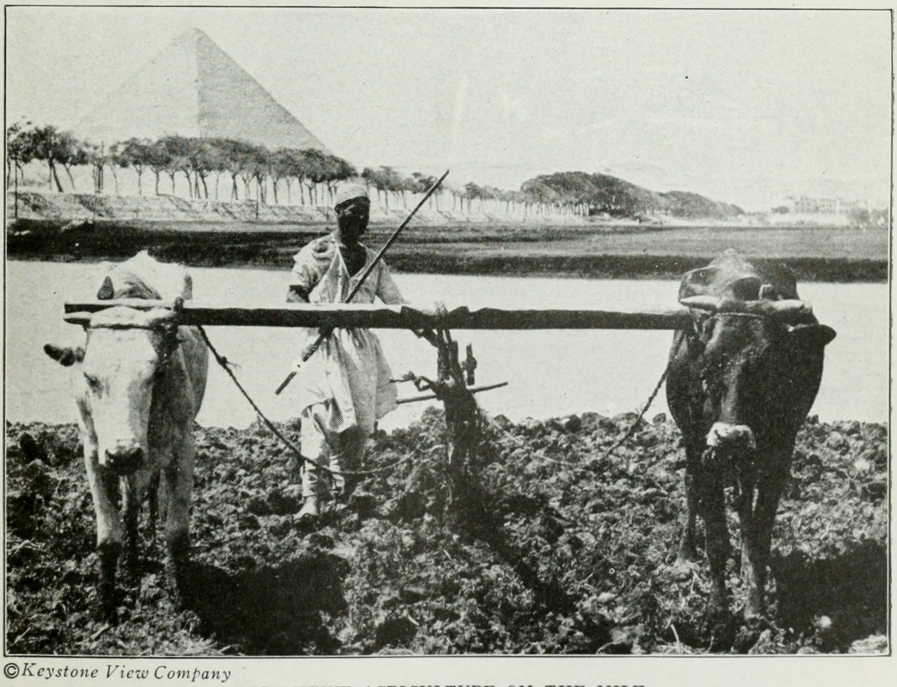


THRESHING WITII MODERN MACHINERY IN MANITOBA



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PLOWING AN ALFALFA FIELD BY TRACTOR



©*Keystone View Company*

PRIMITIVE AGRICULTURE ON THE NILE



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THE CITY AND HARBOR OF ALGIERS, ALGERIA

river, but including Zanzibar, and penetrating a considerable distance into the interior. It covers an area of 1,000,000 square miles. Somaliland was divided between Italy and Great Britain (1877-1891), Italy taking over 300,000 square miles and Great Britain 75,000 square miles opposite Aden. Italy also annexed and colonized Eritrea, on the Red Sea (100,000 square miles), and asserted a protectorate over Abyssinia. But the latter arrangement was repudiated by Abyssinia. Nov. 15, 1896, the latter's independence was recognized by the Italian Government.

The first two decades of the 20th century witnessed great changes in the political distribution of African territory.

In 1905 and again in 1911 France and Germany came into conflict over MOROCCO (*q.v.*). The Orange Free State and the Transvaal, as a result of the Boer War, lost their independence, Kongo Free State was annexed by Belgium, Tripoli became a part of Italy, so that Abyssinia and Liberia remained the only independent nations in Africa.

Prior to the changes brought about as a result of the defeat of Germany in the World War, African territory was divided practically as follows: Egypt, while nominally under Turkish control, was in reality a protectorate of Great Britain, which also exercised sovereignty over the eastern Sudan. Tripoli belonged to Italy, and Tunis and Algeria to France. The greater portion of Morocco also was a French protectorate, while a small portion was governed by Spain. France exercised control of the Sahara region to the upper waters of the Kongo river. Spain possessed a small area on the west coast below Morocco known as Rio de Oro. This was followed by French Mauretania and Senegal, British Gambia, Portuguese Guinea, French Guinea, the British Sierra Leone, Liberia, an additional area of French territory, the British Gold Coast, and Ashanti, German Togoland, French Dahomey, the British Niger territories, and German Kamerun. French Kongo, Portuguese Angola, and German Southwest Africa reached the borders of the Union of South Africa. Between this and the former German province of Southwest Africa on the west is the British protectorate of Bechuanaland and the British colony of Rhodesia. Adjoining East Africa on the north is the former colony of German East Africa. Bordering this on the north is British East Africa, which joins on the north the British sphere of influence in the Sudan and on the coast, Italian Somaliland. West of the latter is the British Somali Coast Protectorate. This adjoins French Somaliland and Eritrea, belonging to Italy. The disposition of such territories as formerly belonged to Germany is described in the section following, Africa in the World War. The details relating to the various divisions mentioned will be found under the headings to these divisions in their proper alphabetical order.

Africa in the World War.—At the outbreak of the war Germany had large colonial possessions in Africa. In less than thirty years of effort, the territory under her control embraced 3,000,000 kilometers with more than 12,000,000 inhabitants. In extent, her African empire was the third largest in the world, and in population was only exceeded by the colonies of France, Great Britain and the Netherlands. Her colonial adventure began in 1884, when at a single stroke she acquired Southwest Africa, Kamerun, and Togoland. New Guinea was colonized by her to one-third of its extent, together with some of the smaller islands in its vicinity, and in 1895 she reached out for German East Africa. By 1900, she had added to these possessions the Caroline and Marshall Islands, and had become one of the great colonizing powers of the Dark Continent. From these colonies she obtained coffee, cocoa, rice, bananas, sugar cane, cotton, jute, tropical textiles, palm-oil, rubber, and a vast variety of other materials for the development of her manufacturing and commercial interests.

When the war broke out, it was a foregone conclusion that communication between the colonies and Germany would be promptly severed, owing to the predominating power of the British navy, to which was to be added the naval strength of Japan. The outcome of the struggle on land was more problematical, for the Germans, though outnumbered by the forces that could be brought against them by the Entente, had the immense advantages of a defensive carried on over vast spaces, through pathless jungles and under especially trying climatic conditions.

The German islands in the Pacific were the first to be captured. Samoa was taken by the New Zealanders on Aug. 29, 1914, without a fight. The Caroline, Marshall, and Solomon Islands were captured by Japan, Oct. 7, 1914, and the Marshall and Solomon Islands were turned over by them to the Australians Dec. 9, 1914. German New Guinea was taken by the Australian Expeditionary Forces on Sept. 13. Thus in about four months the German flag had

been lowered on all her former island possessions in the Pacific.

Togoland, a wedge-shaped territory on the north shore of the great Gulf of Guinea, comprising an area of 33,000 square miles, was attacked by joint French and British forces, and after inconsiderable fighting, that scarcely rose to the dignity of outpost skirmishes, was occupied on Aug. 26, 1914.

The conquest of Cameroon—or Kamerun, as the Germans call it—was attended with more difficulty. The territory was twice as large as Great Britain, much of it mountainous and thickly covered with jungle. Vigorous preparations for defense had been made for months, and there were comparatively large forces of German soldiers, supported by much larger numbers of native troops, thoroughly equipped, under the command of German officers. Trenches and barbed-wire entanglements had been prepared on an extensive scale.

The colony was in a vulnerable position, having British colonies to the northwest and French on the east and south, while the seacoast was at the mercy of the Allied fleets. The Entente plan of campaign was based on these geographical conditions, and sought to drive the German forces toward the center by attacking from the circumference.

In the early part of January, 1915, a junction was effected between a French North Cameroon column under Colonel Brisset and a British force sent from Yola in British Nigeria, under Major Webb-Bowen. In April, the command of the Allied forces, which then numbered 900 men, was taken over by Colonel Cunliffe, and an investment began of the German fortress of Garua. The siege was pressed until June 10, when the garrison under Captain von Krailsheim surrendered unconditionally. The Allied forces, at the end of June, advanced to N'Gaundere, but found that it had been evacuated. On Aug. 11, Kounde was reached by a French force under Captain Jean Ferrandi. An operation was directed against Yoko from Tibati in connection with a column that was being led by Cunliffe from Kontcha. On Nov. 16 a movement was undertaken against strong German positions on Mount Banyo, while on the east two columns, setting out from Bertua and Dume, marched against Tina. The plan was for these forces to converge on Yaunde, the last remaining German stronghold in the territory. The objective was obtained, all resistance proving ineffectual. The remnant of the German forces took refuge in the Spanish Kongo, where they were interned by the Spanish authorities and the conquest of the Cameroon colony was complete.

The campaign in German Southwest Africa began on Sept. 27, when troops of the Union of South Africa invaded the colony. Walfisch Bay was occupied on Christmas Day of the same year, and on Jan. 14 following, Swakopmund was taken. Determined stands were made by the German forces at Tretskopje and Otjimbingwe, but the Germans were scattered and the advance continued. Karibib was occupied on May 5 and Windhoek on May 12. The capture of the latter place was important, as 3,000 Europeans and 12,000 natives were taken prisoners. A valuable wireless station, which had been able to keep in touch with Berlin, was also captured, as well as a large amount of rolling stock. Aus had been taken on April 1 by the force of General Smuts, and this force joined hands with another at Keetmanshoop. The combined columns pushed on in the direction of Gibeon, where a pitched battle was fought, and to Kabus, where they again encountered stubborn but unavailing opposition. After the fall of Windhoek, the campaign degenerated into guerrilla warfare carried on by the Germans from the hills to which they had retreated. By rapid marches and remarkable persistence this last vestige of opposition was subdued, and on July 9 the German Governor Seitz surrendered to the British all the German forces in Southwest Africa, thus bringing the campaign to an end. The Allied strategy had been dictated by General Botha, whose military fame was greatly augmented by his success. The conquered colony was half again as large as the German Empire.

Much more difficult and prolonged was the Allied campaign for the subjection of German East Africa. No other German dependency was so thoroughly prepared for the struggle. There were only three white German regiments, but they had as auxiliaries a well-trained and armed force of 50,000 Arab and negro soldiers, They were possessed of several hundred machine guns and over 100 Krupp 77-millimeter field pieces. The earlier phases of the war were marked by minor German successes, an Anglo-Indian attack on Tanga from the sea being repulsed and considerable British territory in the Kilimanjaro region being occupied. It was not until 18 months after the beginning of the war that the Entente forces were really prepared to begin a vigorous offensive. By that time the local forces in British East Africa, consisting chiefly of native troops, had been augmented by

volunteers and by British and Indian regiments from India. The conquest of Southwest Africa, which by that time had been completed, released the forces that had been there employed, and many of these were transferred to the East African Army, which ultimately reached a strength of 20,000. It had been planned that General Smith-Dorrien should be in command, but ill health prevented, and Gen. Jan C. Smuts was placed at the head of the Expeditionary Force. The first object sought was the conquest of Kilimanjaro, and in pursuance of this plan Smuts reached Mombasa Feb. 9, 1916. On March 9, Taveta was occupied by one of his columns, and on the 11th there was a fiercely contested fight in the mountainous forests of Latema Nek that resulted in a German retreat. In the Kahe hills on March 21, determined resistance was offered, but again the Germans were forced to retire to Usambara, leaving the road to the heart of the country without defense. Smuts decided to strike inland with the Central railway as his objective. General Van Deventer with the 2d Division was sent in a southwest direction to cut the line of communication between the main forces of the Germans and their troops in the lake regions. He reached Kondoa-Irangi on April 9, but here was held up for nearly two months by torrential rains. This was taken advantage of by Von Lettow-Vorbeck, the commander-in-chief of the German forces to concentrate a force of 4,000 men, with whom he attacked Van Deventer, but met with defeat. On Jan 24, the rains having ceased, Van Deventer attained the object of his mission and seized the middle section of the railway.

While he was thus operating, the main army was completing the occupation of Usumbara, capturing Wilhelmstal, its capital, June 13, and Tanga, July 7. An attempt was made to combine with Van Deventer, in the design of surrounding and capturing the army of Von Lettow-Vorbeck, but this was frustrated by the escape of the latter into the Uluguru hills by a road that had been previously unknown to the British. The junction of the two British forces was, however, effected, after the capture of Mrogoro on Sept. 26. The situation was rendered much more favorable for the British, when Dar-es-Salaam, the chief port and capital of the colony, was taken by a naval force Sept. 4. This shortened the British lines of communications by more than 1,000 miles. This success practically ended the campaign for that year, as the troops were exhausted by the frightful conditions under which they had been marching and fighting, and were suffering from dysentery and other diseases. The army was thoroughly rested and reconstituted, 12,000 white troops being sent back to recuperate while their places were taken by newly raised detachments.

While these operations had been progressing, other important and successful campaigns were being carried on in other sections of the vast territory. A Belgian force under General Tombeur had struck at the northwest district and by the end of June had overrun the region between Lake Tanganyika and Lake Victoria Nyanza. The town of Tabora on the Central railway, after ten days of hard fighting, fell into Belgian hands on Sept. 19.

On May 25, 1915, a force of Union troops, King's African Rifles and Rhodesians, under the command of Brigadier-General Northey, attacked the colony from the southwest. The main body followed the road from Lake Nyassa to Iringa which was occupied on July 29. The Rhodesian column was successful in taking Bismarckburg on Lake Tanganyika, from which place it worked northward until it effected a junction with the Belgian troops. The campaign had now lasted for about seven months, and in that time the combined operations of the Entente forces had conquered two-thirds of the colony.

For a year following little was accomplished besides confining the Germans to the southeast part of the territory and the south central Mahenge plateau. Von Lettow-Vorbeck. whose skill and courage were freely recognized by his enemies, succeeded in avoiding capture and in many actions turned at bay and inflicted severe casualties upon his pursuers. But the odds were too heavy, the toils kept tightening, and in June, 1917, a final offensive was begun by the Allies that was pushed steadily to a conclusion. Mahenge was captured in October by a combined force of British and Belgians, and one of the main German divisions was forced to surrender on Nov. 27. From that time on, the campaign resolved itself into a chase, which, however, the resourceful German commander was able to prolong for nearly a year. With a small force he got over the border into Portuguese East Africa, made his way south nearly to the Zambezi, doubled on his tracks in the following September and again made his way into German East Africa. He ultimately reached northern Rhodesia where he finally surrendered Nov. 14, 1918, three days after the armistice had been signed on the western front.

The disposition to be made of the former German colonies in Africa was announced at the Peace Conference, May 6, 1919. The official statement was as follows:

Togoland and Kamerun—France and Great Britain shall make a joint recommendation to the League of Nations as to their future.

German East Africa—The mandate shall be held by Great Britain.

German Southwest Africa—The Mandate shall be held by the Union of South Africa. See WORLD WAR.

AFRICAN METHODIST EPISCOPAL CHURCH. See METHODISM.

AFRICANUS. See SCIPIO.

AGADIR, an Atlantic seaport of Morocco, 64 miles from Mogador, and 375 miles from Tangier. It has a population of about 1,000, and its sole importance lies in the fact that it was the scene of a famous diplomatic episode in 1911. At that time France was establishing a protectorate over part of Morocco, when, without previous announcement the German warship, "Panther," entered the harbor. Intrigues were entered into with the Moroccan chiefs who were invited on board the "Panther," sumptuously entertained, and promised German support in resisting French plans. What promised to be a serious crisis arose, and both nations mobilized troops. Great Britain, however, supported the French position, and Germany was forced to recede. An accord was established Nov. 3, 1911, by which Germany recognized the right of a protectorate over Moroccan territory and France ceded to Germany 230,000 square kilometers in the French Kongo, with other economic advantages. Both parties agreed to secure the consent of other nations to this arrangement.

AGAMEMNON (ag-a-mem'non), king of Mycenæ and Argos, son of Atreus and Eriphyle, brother of Menelaus and commander-in-chief of the Grecian army at the siege of Troy. He married Clytemnestra, sister of Helen, who was the wife of Menelaus. The Trojan war arose out of the abduction of Helen by Paris, son of Priam, King of Troy. During the siege of Troy, protracted for 10 years, Agamemnon appears superior to the other chiefs in battle and in council, and maintains, under all circumstances, the dignity of a commander. The most memorable event of the siege of Troy is the quarrel of Agamemnon and Achilles, the subject of the "Iliad," in which the former placed himself very completely in the wrong. Returning from Troy, Agamemnon was treacherously murdered by his wife. His son ORESTES (*q. v.*), and his daughter Electra eventually avenged their father's murder. These tragic events formed a favorite subject of Greek dramatists, the most famous tragedy on the subject being "Agamemnon" by Æschylus.

AGAÑA (ag-an'ya), the principal town of Guam, the largest of the Ladrone Islands, 1,500 miles E. of Luzon, Philippines, and 1,300 miles S. of Yokohama. As a result of the war between the United States and Spain in 1898, the former took possession of the island of Guam. Pop. about 7,500.

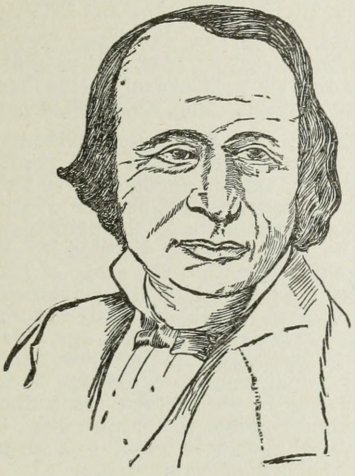
AGAPETUS, the name of two Popes: (1) from June, 535, to April, 536, festival day, Sept. 20; (2) from 946 to 955, a native of Rome.

AGARICUS (ag-ar'ē-cus), a genus of plants, the typical one of the fungus or mushroom family, consisting of species which possesses a fleshy pileus or cap, with a number of nearly parallel or radiating plates or gills on its lower side, bearing spores, the whole being supported upon a more or less lengthened stalk. More than 1,000 species are known. They may be separated into five natural divisions according as the color of the spores is white, pink, ferruginous, purple-brown, or black. There are many sub-genera. Some species are poisonous. See MUSHROOM.

AGASIAS (ag-as'ē-as), of Ephesus, a Greek sculptor who flourished about 400 B. C. The celebrated statue in the Louvre Museum, called "The Gladiator," is his work.

AGASSIZ, ALEXANDER (ä-gä-sē'), an American zoölogist and geologist, son of J. L. R. Agassiz, born in Neuchâtel, Switzerland, Dec. 17, 1835. He came to the United States with his father in 1849; graduated from Harvard in 1855; and received the degree of B. S. from the Lawrence Scientific School in 1857. In 1859 he went to California as assistant on the United States Coast Survey. From 1860 to 1865 he was assistant curator of the Museum of Comparative Zoölogy at Harvard University; and, from 1866 to 1869, superintendent of the Calumet and Hecla mines, Lake Superior. On the death of his father in 1873, he was appointed curator of the Museum of Comparative Zoölogy, holding that position until he resigned in 1885. In 1900 he completed a series of deep sea explorations for the United States Government. His chief works are "List of Echinoderms" (1863); "Exploration of Lake

Titicaca" (1875-1876); "Three Cruises of the Blake, a Contribution to American Thalassography" (1880); etc. He died in March, 1910.



JEAN LOUIS RODOLPHE AGASSIZ

AGASSIZ, JEAN LOUIS RODOLPHE, a Swiss naturalist, born at Môtier, Switzerland, May 28, 1807. He studied medicine and comparative anatomy in the universities of Zürich, Heidelberg, and Munich. He gave many years to study of fossil fishes, and his first great work bore that title (1834). His next special researches were directed toward the explanation of glaciers, and he published "Studies of Glaciers" (1844). In 1846 he made a lecturing tour of the United States, and, in 1848, became Professor of Geology at Harvard, and, in 1859, curator of the Museum of Comparative Zoölogy. His contributions to the development of the facts and principles of natural science in his special departments are very numerous and of highest authority. Chief among his works written in English are "Principles of Zoölogy;" "The Structure of Animal Life"; "Scientific Results of a Journey in Brazil"; "Natural History of the Fresh-Water Fishes of Europe"; and "Contributions to the Natural History of the United States." Other important works are "Studies on the Glaciers," "The Glacial System," and "Researches on Fossil Fishes." He died at Cambridge, Mass., Dec. 14, 1873.

AGATE, a mineral classed by Dana as one of the cryptocrystalline varieties of quartz, some of the other minerals falling under the same category being chalcedony, carnelian, onyx, hornstone, and jasper.

AGAVE, an extensive genus of plants belonging to the natural order *amaryllidaceæ*. The species have large, fleshy leaves, with teeth ending in spinous points. From the center of a circle of these leaves there rises, as the plant approaches maturity, a tall scape of flowers. The idea that the agave blossoms but once in a hundred years is a fable. But as a result of this popular misconception the plant is known under the name of Century Plant. What really happens is, that some species, taking many years (10 to 70, it is thought) to come to maturity, flower but once, and then die. The plant originally belonged to North America and is chiefly found in Mexico. It is now cultivated in the south of Europe.

AGE, any period of time attributed to something as the whole, or part, of its duration: as the age of man, the several ages of the world, the golden age.

In Physiology.—If the word age be used to denote one of the stages of human life, then physiology clearly distinguishes six of these: viz., the periods of infancy, of childhood, of boyhood or girlhood, of adolescence, of manhood or womanhood, and of old age. The period of infancy terminates at 2, when the first dentition is completed; that of childhood at 7 or 8, when the second dentition is finished; that of boyhood or girlhood at the commencement of puberty, in temperate climates from the 14th to the 16th year in the male and from the 12th to the 14th in the female; that of adolescence extends to the 24th year in the male and the 20th in the female; that of manhood or womanhood stretches on till the advent of old age, which comes sooner or later, according to the original strength of the constitution in each individual case, and the habits which have been acquired during life. The precise time of human existence similarly varies.

In Archæology.—The Danish and Swedish antiquaries and naturalists, MM. Nilson, Steenstrup, Forchamber, Thomsen, Worsaae, and others, have divided the period during which man has existed on the earth into three—the age of stone, the age of bronze, and the age of iron. During the first-mentioned of these he is supposed to have had only stone for weapons, etc. Sir John Lubbock divides this into two—the palæolithic, or older, and the neolithic, or newer, stone period. At the commencement of the age of bronze that composite metal became known, and began to be manufactured into weapons and other instruments; while, when the age of iron came in, bronze began gradually to be superseded by the

last-mentioned metal. (Lyell's "The Antiquity of Man"; Lubbock's "Prehistoric Times.")

In Law, the time of competence to do certain acts. In the United States, both males and females are of full age at 21. The age at which minors may be punished or may marry varies in the several States.

Age of Animals.—The duration of life in animals is generally between seven and eight times the period which elapses from birth till they become adult; but this rule, besides being vague and indefinite, is quite useless in practice, because it affords no scale of graduation which would enable us to ascertain the precise age of individuals.

Age of Plants.—Plants, like animals, are subject to the laws of mortality, and, in many cases, have the period of their existence determined by nature with as much exactness as that of an insect. It is principally to annual and biennial plants that a precise period of duration is fixed. The remainder of the more perfect part of the vegetable kingdom, whether herbaceous, or shrubby, or arborescent, consist of plants which may be classed under two principal modes of growth. One of these modes is to increase, when young, in diameter, rather than in length until a certain magnitude is obtained, and then to shoot up a stem, the diameter of which is never materially altered. The addition of new matter to a trunk of this kind takes place by the insinuation of longitudinal fibers into the inside of the wood near the center; on which account such trees are called endogenous, or monocotyledons. The other mode is, from the beginning, to increase simultaneously in length and diameter, but principally in length. The addition of new matter to a trunk of this kind takes place by the insinuation of longitudinal fibers into a space beneath the bark, and on the outside of the wood, near the circumference; on which account such trees are called exogenous, or dicotyledons. The way by which the age of exogenous trees may be computed is by cutting out a portion of their circumference, and counting the number of concentric rings that are visible; the woody cylinder of one year being divided from the succeeding one by a denser substance, which marks distinctly the line of separation of the two years. In consequence of the extreme inequality in thickness of the annual layers of wood on opposite sides of a stem, a person judging of the whole age of a tree by the examination of the layers of the stunted side only would commit errors to the amount of 60 per cent., and more.

AGEN (ä-zhon′ a town of France capital of the department of Lot-et-Garonne, on the right bank of the Garonne, on the railway from Bordeaux to Toulouse. Its situation though rather unhealthy, makes it the *entrepôt* of the commerce between Bordeaux and Toulouse. The town is very ancient, seat of a bishop, and possesses a cathedral dating back to the 6th century. Pop. about 25,000.

AGENT, in law, one person who acts for another, called the principal. If a person acts as agent without authority, the subsequent ratification of the act will make it binding on the principal just as if he had originally directed it. When an agent acts within the scope of his employment, he may bind his principal, and the principal is liable for any fraudulent acts or wrong-doings of the agent so acting. If the agent, having power to bind his principal, does so expressly, he is not liable; but if he exceeds his authority, he becomes personally responsible. Upon the law of agency is based, to a large degree, the law of partnership.

AGESANDER (aj-es-an′der), a famous sculptor of Rhodes, who, in the time of Vespasian, made a representation of the Laocoon's history, which now passes for the finest relic of all ancient sculpture. The Laocoon was discovered at Rome in 1506, and afterward deposited in the Farnese palace, where it still remains.

AGESILAUS (aj-es-ē-lā′us), King of Sparta, was elevated to the throne chiefly by the exertions of Lysander. He was born about 444 B. C. and was one of the most brilliant soldiers of antiquity. Being called upon by the Ionians to assist them against Artaxerxes, he commenced a splendid campaign in Asia; but was compelled by the Corinthian War, in which several of the Grecian states were allied against Sparta, to leave his conquest over the Persians incomplete, and return to Greece. At Coronea (394 B. C.), he gained a victory over the allied forces. He died about 360 B. C.

AGINCOURT, now **AZINCOURT,** a small village in the center of the French department of Pas-de-Calais, celebrated for a bloody battle between the English and French, Oct. 25, 1415. Henry V., of England, had landed at Harfleur, had taken that fortress and was marching to Calais, in order to go into winter quarters. But a French army, vastly superior in number, intercepted the English march to Calais, near the village of Agincourt. The invading army, weakened in numbers, and suffering from want of provisions, was still 14,000 strong; the French, under the Constable d'Albret, numbered 50,000,

or more. The battle lasted three hours, and was a signal victory for the English, due mainly to the archers. As many as 10,000 Frenchmen are said to have fallen. The English lost 1,600 killed.

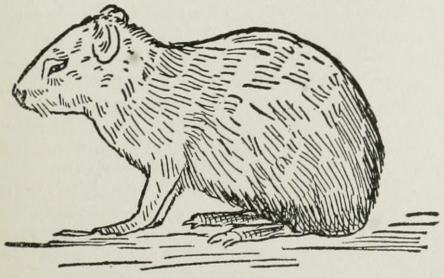
AGNES, ST., a holy woman, who suffered martyrdom in the reign of the Emperor Diocletian. Her emblem is a lamb, and her calendar day Jan. 21.

AGNO (ag'nō), an important river in the N. W. part of Luzon, Philippine Islands. It is about 125 miles in length, describing a circuitous course, parallel with a range of coast mountains, and emptying into Lingayen Gulf.

AGNOSTICISM, a school of thought which believes that, beyond what man can know by his senses or feel by his higher affections, nothing can be known. Facts, or, supposed facts, both of the lower and the higher life, are accepted, but all inferences deduced from these facts as to the existence of an unseen world, or of beings higher than man, are considered unsatisfactory, and are ignored.

AGOULT (ä-gö'), **MARIE CATHERINE SOPHIE DE FLAVIGNY, COMTESSE D'**, a French author and socialist, born at Frankfort-on-Main, Dec. 31, 1805; in sympathy with the revolutionists of 1848. After separation from her husband, she became the mistress of the famous pianist, Franz Liszt, by whom she had a son and two daughters. One of the latter, Cosima, married first Hans von Bülow and later Richard Wagner. She died at Paris, March 5, 1876.

AGOUTI, a South American animal, of the family *hystricidæ*, order *rodentia*. The agoutis live for the most part upon the surface of the ground, not climbing nor digging to any depth. By eating the roots of the sugar-cane, they are often



AGOUTI

the cause of great injury to the planters. The ears are short, and the tail rudimentary. The animal is nearly 2 feet long. It is found in Guiana, Brazil, Paraguay, and some of the Antilles.

AGRA. (1) A division of the United Provinces of Agra and Oudh, British India; area, 10,151 square miles; pop., about 5,000,000. (2) A district of the same name, consisting of a level plain diversified by sandstone hills. The soil is barren and sandy, and, through the failure of rains, famines frequently occur; area, 1,850 square miles; pop. about 1,000,000. (3) The capital of Agra district, on the right bank of the Jumna, 110 miles S. E. of Delhi, and 841 miles N. W. of Calcutta. Agra is the handsomest city in upper India. Some of the public buildings, monuments of the house of Timur, are on a scale of striking magnificence. Among these are the fortress, built by Akbar, within the walls of which are the palace and audience-hall of Shah Jehan, the Moti Masjid, or pearl mosque, and the Jama Masjid, or great mosque. Still more celebrated is the white marble Taj Mahal, situated without the city, about a mile to the east of the fort. The city is considered especially sacred through Vishnu's incarnation there as Parasu Rama. The climate, during the hot and rainy seasons (April to September), is very injurious to Europeans. The principal articles of trade are cotton, tobacco, salt, grain, and sugar. There are manufactures of shoes, pipe stems, and gold lace, and of inlaid mosaic work, for which Agra is famous. During the Indian mutiny, in 1857, it was a place of refuge for the Europeans. It is a very important railway center, and has many claims to be regarded as the commercial capital of the northwest. Pop. about 200,000.

AGRAM (Croatian, Zagreb), capital of the former Hungarian crownland of Croatia-Slavonia, lies at the foot of a richly wooded range of mountains, about 2 miles from the Save, and 142 miles N. E. of Fiume by rail. It is divided into three parts—the upper town, built upon two eminences; the lower town; and the episcopal town. The cathedral, dating partly from the 11th century, is one of the finest Gothic buildings in Austria. Ninety per cent. of the inhabitants are Croats, who carry on a trade in wine, wood, and corn, and manufacture tobacco, leather, and linen. Repeated shocks of earthquake, in November, 1880, and again in December, 1901, did serious damage to the city's buildings. Agram possesses a university, founded in 1874, numerous secondary schools and libraries. Pop. about 85,000.

AGRAM NATIONAL COUNCIL. In November, 1918, after the armistice had been signed and the Hapsburg Empire was rapidly disintegrating, representa-

tives of the Jugoslav provinces formerly under Austro-Hungarian control met in a National Council at Agram. They unanimously voted for the union of all these provinces with Serbia and Montenegro and chose Crown Prince Alexander of Serbia as Regent of the new State whose official name was fixed as the "Kingdom of the Serbs, Croats, and Slovenes."

AGRARIAN LAWS, in the ancient Roman republic, were laws of which the most important were those carried by C. Licinius Stolo, when tribune of the people, in B. C. 367. The second rogation, among other enactments, provided (1) that no one should occupy more than 500 *jugera* (by one calculation, about 280, and by another, 333, English acres) of the public lands, or have more than 100 large, and 500 small, cattle grazing upon them; (2) that such portion of the public lands above 500 *jugera* as was in possession of individuals should be divided among all the plebeians, in lots of seven *jugera*, as property; (3) that the occupiers of public land were bound to employ free laborers, in a certain fixed proportion to the extent of their occupation. When, at a later period, efforts were made to revive the Licinian rogations, such opposition was excited that the two Gracchi lost their lives in consequence, and this, with their other projects, proved abortive.

AGRARIAN PARTY, a political organization in Germany, representing the interests of the landlords (in political life). The first steps toward the formation of the party were taken by an assembly, called together at Breslau, in May, 1869. Their programme was especially devoted to the abolition of taxes on land, buildings and trades. The Agrarian party took an important share in opposing commercial relations with the United States, especially in foodstuffs.

AGREEMENT, a mutual bargain, contract, or covenant. Every state has particular laws on this important matter. It may, however, be noticed as general rule: (1) That the assent is the essence of an agreement, and that the parties must be in situations to testify their free assent to it. Thus lunatics, infants, and, in certain cases, married women, are, for obvious reasons, deemed incapable of binding themselves by any engagement. (2) That the subject of agreement must not be tainted with illegality. (3) In order to secure the aid of the law in carrying it into effect, an agreement must have certain qualities mutually beneficial to the parties, or must be entered into with certain prescribed solemnities. Courts of justice cannot be called upon to take cognizance of idle or inconsiderate promises. An agreement must either be contracted by a formal instrument in writing, sealed and openly acknowledged by the party who has bound itself to it; or, if contracted in a less formal manner, by word or otherwise, it must appear that the parties derive from it reciprocal benefit.

AGRICOLA, CNÆUS JULIUS (agrik'ō-la), Roman statesman and general, born in 37 A. D. He went to Britain in 77 A. D., strengthened the Roman power, and extended it to the Scotch Highlands. His success made Domitian jealous of him, and he retired from public life in 84. He died in 92.

AGRICOLA, RUDOLPHUS, an eminent Dutch scholar was born near Groningen, in Friesland, Aug. 23, 1443. His real name, ROELOF HUYSMANN (husbandman), he Latinized into Agricola; and from his native place he was also called Frisius, or Rudolf of Groningen. From Groningen he passed to Louvain, then to Paris, and then to Italy, where, during the years 1473-1480, he attended the lectures of the most celebrated men of his age, and where he entered into a close friendship with Dalberg, afterward Bishop of Worms. Several cities of Holland vainly strove with each other to obtain his presence, but not even the brilliant overtures made to him by the Emperor Maximilian, to whose court he had repaired in connection with affairs of the town of Groningen, could induce him to renounce his independence. At length yielding (1483) to the solicitations of Dalberg, he established himself in the Palatinate. He died at Heidelberg, Oct. 28, 1485.

AGRICULTURAL CHEMISTRY, that department of chemistry which treats of the composition of soils, manures, plants, etc., with the view of improving practical agriculture. The science is comparatively young. The first steps were taken by the experimental investigations in the life processes of plants, by Hales, in 1727, and also by Ingenhousz, whose work on "Experiments upon Vegetables" was published in London, in 1779, and by Saussure, whose work appeared in Paris, in 1804. In 1813, Sir Humphry Davy published his "Elements of Agricultural Chemistry," and he is considered among the English as the founder of the science. Comparatively little, however, was done in the matter until Liebig, in 1840, published his "Organic Chemistry, in Its Relation to Agriculture and Physiol-

ogy," which was regarded as an epoch-making work. Since then great strides have been taken in this science. The most important bases of agricultural chemistry to-day are the experimental stations which are found in agricultural colleges, and in many of the universities in the United States and elsewhere.

AGRICULTURAL EDUCATION, education in the theory and practice of agriculture has received much attention in the present generation, especially in the last decade. In addition to the regular schools of agriculture maintained by most of the States, all the State colleges and universities and many of the private colleges and universities maintain departments for agricultural training. The courses given in these departments include all phases of the agricultural industry and many branches outside this immediate field. The Association of American Agricultural Colleges and Experiment Stations exercises general supervision over the methods and material of instruction in the United States. Experiment stations are maintained in many parts of the continental United States and in the dependencies. Most of the State universities and agricultural colleges also maintain separate experiment stations and great benefit has resulted from the researches and experiments carried on. Much of the work is done in model farms which are maintained in connection with the course of instruction. The United States Government contributes sums averaging about $1,500,000 a year divided among the States for the maintenance of experiment stations. The total number of stations is about 70. Other countries, especially Great Britain and France, are also active in promoting agricultural education. This work, delayed naturally by the war, was taken up with renewed vigor at its close.

AGRICULTURAL MACHINERY. See TOOLS AND MACHINERY.

AGRICULTURE, the art of cultivating the ground, whether by pasturage, by tillage, or by gardening. In many countries the process of human economical and social development has been from the savage state to hunting and fishing, from these to the pastoral state, from it again to agriculture, properly so called, and thence, finally, to commerce and manufactures, though even in the most advanced countries every one of the stages now mentioned, excepting only the first, and, in part, the second, still exist and flourish. The tillage of the soil has existed from a remote period of antiquity, and experience has from time to time improved the processes adopted and the instruments in use; but it was not till a very recent period that the necessity of basing the occupation of the farmer on physical and other science has been even partially recognized. Now a division is made into theoretical and practical agriculture, the former investigating the scientific principles on which the cultivation of the soil should be conducted, and the best methods of carrying them out; and the latter actually doing so in practice.

The soil used for agricultural purposes is mainly derived from subjacent rocks, which cannot be properly understood without some knowledge of geology, while a study of the dip and strike of the rocks will also be of use in determining the most suitable directions for drains and places for wells. The composition of the soil, manures, etc., requires for its determination agricultural chemistry. The weather cannot be properly understood without meteorology. The plants cultivated, the weeds requiring extirpation, the fungus growths which often do extensive and mysterious damage, fall under the province of botany; the domestic animals, and the wild mammals, birds and insects which prey on the produce of the field, under that of zoölogy. The complex machines and even the simplest implements are constructed upon principles revealed by natural philosophy; farm buildings cannot be properly planned or constructed without a knowledge of architecture. Rents can be understood only by the student of political economy. Finally, farm laborers cannot be governed or rendered loyal and trustworthy unless their superior knows the human heart, and acts on the Christian principle of doing to those under him as he would wish them, if his or their relative positions were reversed, to do to him. Notwithstanding the enormous expansion of the manufacturing industries in the 19th century, agriculture is still the greatest of the occupations of man.

Historical and General Aspects.—In all countries and ages, history records no instance of any civilization attained without noteworthy progress in agriculture. The relationship of agriculture to population expansion is one of the vital questions for economists. It appears that, in times so remote that their antiquity is only conjecturable, an excellent system of agriculture supported, in the valleys of the Nile and Euphrates, populations at least as dense as any existing to-day. The same agricultural perfection, attended by much the same exceptional conditions of the population which distin-

guished the oldest civilizations of the world, is still conspicuously characteristic of such Oriental countries as retain any national vitality, especially India, China, and Japan. For instance, Japan contains more inhabitants than the United Kingdom, and supports them without taking any food products from abroad (actually, indeed, exporting considerable quantities of rice), whereas England imports foodstuffs to the value of hundreds of millions of dollars.

In the Middle Ages, agriculture was almost wholly disregarded throughout Europe, and, consequently, civilization was generally at a low ebb. On the other hand, the era of the Saracens in Spain is memorable for civilization, and particularly for its admirable agriculture. Without exception, all the European nations that enjoy eminence to-day possess carefully developed agricultural systems, while in Spain, the one noticeably backward country, agriculture languishes. It is proverbial that the wealth of France is not in her luxurious capital, but in her provincial acres. Belgium and Holland, the richest regions of Europe in proportion to area, with populations correspondingly dense, owe their pre-eminence to the elaborate cultivation. The collapse of the Mohammedan power finds one of its chief explanations in the indolence of the Turk and his neglect of the soil.

The first mention of agriculture is found in the writings of Moses. From them we learn that Cain was a "tiller of the ground;" that Abel sacrificed the "firstlings of his flock;" and that Noah "began to be a husbandman and planted a vineyard." The Chinese, Japanese, Chaldeans, Egyptians, and Phœnicians appear to have held husbandry in high estimation. The Egyptians were so sensible of its blessings that they ascribed its invention to superhuman agency, and even carried their gratitude to such an excess as to worship the ox, for his services as a laborer. The Carthaginians carried the art of agriculture to a higher degree than other nations, their contemporaries. Mago, one of their most famous generals, wrote no less than 28 books on agricultural topics, which, according to Columella, were translated into Latin by an express decree of the Roman Senate. Hesiod, the Greek writer, supposed to be contemporary with Homer, wrote a poem on agriculture, entitled "Weeks and Days," which was so denominated because husbandry requires an exact observance of times and seasons. Other Greek writers wrote on rural economy, and Xenophon, among the number, but their works have been lost in the lapse of ages. Columella, who flourished in the reign of the Emperor Claudius, wrote 12 books on husbandry, which constituted a complete treatise on rural affairs. Pliny ascribes the invention of manures to the Greek King Augeas, and Theophrastus not only mentions six kinds of manures, but declares that a mixture of soils produces the same effects as manures. Cato, the Roman censor, equally celebrated as a statesman, orator, and general, derived his highest and most durable honors from having written a voluminous work on agriculture. In the "Georgics" of Vergil, the majesty of verse and the harmony of numbers add dignity and grace to the most useful of all topics. Varro, Pliny, and Palladius were likewise among the distinguished Romans who wrote on agricultural subjects.

It is interesting to note here that irrigation had an influential advocate as long ago as the time of Vergil, who in his "Georgics" advises husbandmen to "bring down the waters of a river upon the sown corn, and, when the field is parched and the plants drying, convey it from the brow of a hill in channels." To the credit of the Romans let it be remembered that, unlike many conquerors, instead of desolating they improved the countries which they subdued, and first of all in agriculture.

Recent Progress.—From the details of primitive agricultural methods given in ancient writings and represented in monumental inscriptions, it is evident that not till the 19th century had anything very material been done toward the creation of a distinctive agricultural science. The original arts of husbandry, practiced ages ago, have simply been adapted, with little improvement till very lately, to modify conditions. Most of the mechanical appliances to which our ancestors were restricted—the plow, roller, hoe, sickle—are found pictured in the Egyptian inscriptions and paintings. It is also known that the Egyptians were familiar with the advantages of rotation in crops, and that they were exceedingly intelligent and systematic in the administration of estates and the regulation of all rural concerns.

Within the last hundred years, however, the foundations of an entirely new agriculture have been securely laid. The two active agencies in this change have been chemical science and invention. Chemical science, as applied to agriculture, is based on very simple elements. The arable surface soil becomes exhausted if grain is sown upon it in successive years, this exhaustion being occasioned by the removal of the mineral substances necessary to the life of the grain. By

the system of rotation, a cereal crop is followed by a so-called green crop, the roots of which penetrate deep into the subsoil and extract from it a fresh supply of the needful minerals; thus the vigor of the surface soil is renewed and it again produces an abundant grain crop.

The fundamentals of the new rural economy are to secure maximum productiveness on the agricultural lands, as a whole, by a comprehensive utilization of a great variety of fertilizers, and, by studying the needs of the soil, to apply to them the particular fertilizers best adapted to their nature. The demonstrations of experimental chemistry in these directions have been so effective that agricultural science has become one of the leading subjects of practical investigation, receiving the actual encouragement of all civilized governments. The energetic spirit stimulated by the latest teachings of chemical science has reflected constant advance in all other departments of scientific agriculture, such as drainage, irrigation, the improvement of breeds and plants, meteorology, etc.

Agricultural Interests and the Government.—The growth of agriculture and the evolution of enlightened governmental administration have uniformly gone hand in hand. The great distinguishing characteristic of the Dark Ages in Europe was the crushing oppression of the rural population. The lifting of the arbitrary burdens resting on the agricultural class has in all countries marked the beginning of the era of enlarged civil liberty and of diffused intelligence. The marvelous progress of the United States is above all the result of the rapid absorption of lands by its own native citizens and by industrious immigrants from Europe. From the earliest period the Federal Government, having enormous tracts of unoccupied lands at its disposal, pursued an extremely liberal policy to encourage settlement. Thus, in a brief time, every section of the country was peopled and the foundations of a great commonwealth were laid. With the vigorous revival of enterprise and thrift after the Civil War, and the steady advance of immigration, the epoch of abundant, fertile lands obtainable for a nominal price was brought to its close; and the intense rivalry witnessed at the opening of Oklahoma Territory was a demonstration of the practical termination of the era of settlement. In a new country, the soil of which has been accessible to all, the farmers have not been prompt to turn their attention to the strictly scientific aspects of agriculture, yet the government has manifested appreciation of the spirit of the age and the needs of the future by its generous provisions for the founding of agricultural colleges, and by its admirable system of agricultural experiment stations. The latter, like the agricultural colleges, are modeled upon the technical institutions originated in Europe for scientific investigation concerning all the branches of agriculture. The Federal Government makes an annual grant for experiment station purposes to each State and Territory in which an agricultural college is in operation, and some of the States also contribute to the support of the stations. The Department of Agriculture of the National Government is excellently equipped for the promotion of agricultural interests in both practical and experimental aspects. Its Weather Bureau, Bureau of Animal Industries, and various divisions, are constantly performing work of much value, and a great variety of useful information is systematically disseminated.

The following tables give the acreage, value, and production (000 omitted) of the principal agricultural crops in 1919:

BARLEY

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Maine	6	168	286
New Hampshire	1	25	47
Vermont	14	420	630
New York	113	2,486	3,381
Pennsylvania	16	392	502
Maryland	6	198	244
Virginia	15	375	488
Ohio	125	3,150	3,938
Indiana	55	1,430	1,687
Illinois	212	5,724	6,926
Michigan	280	5,320	6,278
Wisconsin	512	13,568	16,417
Minnesota	910	18,200	21,112
Iowa	315	8,032	8,996
Missouri	11	330	429
North Dakota	1,300	14,950	16,146
South Dakota	875	19,250	22,138
Nebraska	217	5,577	5,577
Kansas	600	16,200	16,200
Kentucky	4	100	157
Tennessee	8	176	317
Texas	25	875	980
Oklahoma	50	1,500	1,830
Montana	90	540	756
Wyoming	35	525	919
Colorado	200	3,900	4,680
New Mexico	20	680	748
Arizona	29	1,102	1,543
Utah	24	720	1,015
Nevada	12	420	630
Idaho	120	3,360	4,704
Washington	138	4,140	5,589
Oregon	82	1,886	2,829
California	1,000	30,000	42,300
United States	7,420	165,719	200,419

CORN

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Maine	20	1,100	2,145
New Hampshire	21	1,050	1,785
Vermont	40	2,120	3,710
Massachusetts	44	2,640	4,541
Rhode Island	11	495	921
Connecticut	55	3,300	5,940
New York	820	35,260	58,532
New Jersey	270	10,800	16,524
Pennsylvania	1,536	72,192	106,122
Delaware	230	6,900	10,005
Maryland	693	28,413	39,778
Virginia	1,600	44,800	75,712
West Virginia	735	24,990	40,984
North Carolina	2,900	55,100	101,935
South Carolina	2,340	37,440	73,757
Georgia	4,820	69,890	111,824
Florida	840	12,600	17,640
Ohio	3,700	162,800	196,988
Indiana	4,750	175,750	219,688
Illinois	8,600	301,000	391,300
Michigan	1,650	64,350	88,803
Wisconsin	1,820	85,540	106,925
Minnesota	2,950	118,000	141,600
Iowa	10,000	416,000	499,200
Missouri	5,756	155,412	214,469
North Dakota	508	16,764	23,470
South Dakota	3,200	91,200	108,528
Nebraska	7,030	184,186	224,707
Kansas	4,475	69,362	97,107
Kentucky	3,300	82,500	127,875
Tennessee	3,250	74,750	117,358
Alabama	4,334	62,843	99,920
Mississippi	3,980	59,700	95,520
Louisiana	1,850	32,375	48,562
Texas	6,760	202,800	239,004
Oklahoma	3,100	74,400	94,488
Arkansas	2,707	48,726	79,911
Montana	128	1,728	2,851
Wyoming	48	768	1,267
Colorado	671	11,206	15,913
New Mexico	240	7,200	10,872
Arizona	39	1,287	2,574
Utah	24	432	648
Nevada	3	90	126
Idaho	24	840	1,386
Washington	45	1,620	2,997
Oregon	71	1,860	2,883
California	87	2,871	5,139
United States	102,075	2,917,450	3,934,234

FLAXSEED

	Acres	Bushels	Dollars
Wisconsin	6	63	271
Minnesota	320	2,880	12,816
Iowa	16	152	638
Missouri	5	48	215
North Dakota	760	3,800	16,758
South Dakota	145	1,160	4,930
Nebraska	3	15	60
Kansas	14	88	334
Montana	410	697	3,067
Wyoming	4	16	56
Colorado	...	....	....
United States	1,683	8,919	39,145

WHEAT

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Maine	12	228	502
Vermont	12	252	572
New York	524	11,178	24,032
New Jersey	109	1,962	4,316
Pennsylvania	1,664	29,055	62,758
Delaware	145	1,740	3,706
Maryland	790	10,665	22,930
Virginia	1,060	12,508	28,018
West Virginia	400	5,400	11,880
North Carolina	850	7,225	16,834
South Carolina	204	1,836	4,737
Georgia	240	2,520	6,628
Ohio	2,860	54,440	115,413
Indiana	2,886	46,020	96,642
Illinois	4,150	65,675	137,918
Michigan	1,035	20,237	42,497
Wisconsin	549	7,355	15,814
Minnesota	4,015	37,710	94,276
Iowa	1,700	23,675	47,350
Missouri	4,296	57,886	120,982
North Dakota	7,770	53,613	129,207
South Dakota	3,725	30,175	72,420
Nebraska	4,384	60,675	122,564
Kansas	11,624	151,001	324,652
Kentucky	1,046	12,029	25,381
Tennessee	810	7,290	16,184
Alabama	138	1,242	3,043
Mississippi	36	504	1,260
Texas	1,900	31,350	62,700
Oklahoma	3,760	52,640	107,912
Arkansas	340	3,230	6,525
Montana	2,221	10,729	25,214
Wyoming	284	4,008	8,497
Colorado	1,459	17,645	35,643
New Mexico	283	6,100	12,200
Arizona	43	1,204	2,709
Utah	304	3,682	7,732
Nevada	29	668	1,429
Idaho	1,030	18,705	38,345
Washington	2,440	40,100	85,814
Oregon	1,126	20,495	43,449
California	900	16,335	33,323
United States	73,243	940,987	2,024,008

COTTON

	Acres	Bales	Dollars
Virginia	42	22	3,850
North Carolina	1,568	875	154,000
South Carolina	2,881	1,475	263,288
Georgia	5,288	1,730	309,670
Florida	117	17	3,570
Alabama	2,621	715	124,410
Mississippi	2,950	946	177,375
Louisiana	1,532	300	52,500
Texas	10,346	2,700	472,500
Arkansas	2,563	830	151,060
Tennessee	775	298	49,915
Missouri	111	60	10,200
Oklahoma	2,341	930	163,680
California	167	102	21,930
Arizona	116	75	19,125
Other	11	7	1,250
United States	33,344	11,030	1,967,143

OATS

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Maine	169	5,746	5,286
New Hampshire	33	1,221	1,038
Vermont	110	3,960	3,564
Massachusetts	15	570	513
Rhode Island	2	68	65
Connecticut	20	620	546
New York	1,160	29,580	24,551
New Jersey	82	2,460	1,968
Pennsylvania	1,189	36,859	29,487
Delaware	5	115	104
Maryland	65	1,820	1,492
Virginia	240	5,280	5,280
West Virginia	190	4,750	4,322
North Carolina	322	3,767	3,993
South Carolina	510	11,730	12,903
Georgia	540	10,800	12,420
Florida	60	1,140	1,368
Ohio	1,548	51,858	37,338
Indiana	1,825	60,225	41,555
Illinois	4,102	123,060	86,142
Michigan	1,475	36,875	26,181
Wisconsin	2,339	78,123	54,686
Minnesota	3,220	90,160	57,702
Iowa	5,670	196,182	125,556
Missouri	1,417	38,259	27,164
North Dakota	2,400	38,400	25,728
South Dakota	1,850	53,650	33,800
Nebraska	2,133	69,962	45,475
Kansas	1,574	44,229	32,287
Kentucky	440	9,900	9,009
Tennessee	400	9,200	8,556
Alabama	372	6,696	7,031
Mississippi	278	5,282	5,446
Louisiana	75	1,650	1,650
Texas	2,250	94,500	60,480
Oklahoma	1,500	49,500	34,650
Arkansas	420	9,240	8,131
Montana	612	6,120	6,569
Wyoming	315	5,670	6,350
Colorado	249	6,524	5,872
New Mexico	65	2,340	2,223
Arizona	13	533	533
Utah	72	2,448	2,399
Nevada	12	384	384
Idaho	220	7,700	7,546
Washington	320	12,800	11,904
Oregon	347	11,104	10,216
California	175	5,250	5,040
United States	42,400	1,248,310	895,603

POTATOES

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Maine	102	24,480	34,272
New Hampshire	20	2,400	4,200
Vermont	25	3,125	4,906
Massachusetts	33	2,970	5,643
Rhode Island	5	425	765
Connecticut	24	1,680	3,276
New York	363	39,567	57,372
New Jersey	110	10,560	17,846
Pennsylvania	254	25,400	39,116
Delaware	11	913	1,141
Maryland	55	5,170	6,721
Virginia	121	11,495	18,047
West Virginia	57	5,130	8,978

POTATOES—Continued

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
North Carolina	58	4,930	8,036
South Carolina	27	2,295	4,590
Georgia	23	1,610	3,494
Florida	24	1,824	3,830
Ohio	150	9,300	17,856
Indiana	100	4,400	8,580
Illinois	155	8,060	15,798
Michigan	326	28,688	38,729
Wisconsin	300	28,200	39,480
Minnesota	300	26,100	39,933
Iowa	115	4,945	9,494
Missouri	110	8,250	15,180
North Dakota	90	5,670	9,072
South Dakota	90	4,500	8,550
Nebraska	115	6,325	12,018
Kansas	68	5,168	9,819
Kentucky	72	5,040	10,584
Tennessee	48	3,120	5,366
Alabama	44	3,520	7,568
Mississippi	18	1,530	2,830
Louisiana	25	1,600	3,520
Texas	52	3,796	7,972
Oklahoma	44	3,520	7,216
Arkansas	41	3,321	6,808
Montana	47	2,820	4,512
Wyoming	33	2,640	5,016
Colorado	92	11,040	18,768
New Mexico	11	495	940
Arizona	5	350	682
Utah	17	2,397	3,284
Nevada	6	900	1,350
Idaho	36	5,400	8,154
Washington	58	7,250	10,512
Oregon	45	4,230	6,345
California	88	11,352	19,412
United States	4,013	357,901	577,581

BUCKWHEAT

	Acres	Bushels	Dollars
Maine	17	408	714
New Hampshire	2	52	81
Vermont	9	225	382
Massachusetts	2	44	70
Connecticut	5	100	200
New York	233	5,126	7,433
New Jersey	11	198	297
Pennsylvania	256	5,530	7,742
Delaware	6	108	173
Maryland	14	322	499
Virginia	25	475	736
West Virginia	42	882	1,499
North Carolina	11	209	293
Ohio	26	621	963
Indiana	14	231	346
Illinois	4	72	130
Michigan	48	662	907
Wisconsin	31	502	753
Minnesota	15	240	312
Iowa	7	98	166
Missouri	6	90	166
Nebraska	1	16	29
Tennessee	5	90	135
United States	790	16,301	24,026

RYE

State	Acreage	Production	Total farm value
	Acres	Bushels	Dollars
Vermont	1	17	26
Massachusetts	5	115	201
Connecticut	11	220	440
New York	120	1,932	2,898
New Jersey	81	1,296	2,074
Pennsylvania	228	3,648	5,727
Delaware	2	26	42
Maryland	30	420	685
Virginia	72	828	1,408
West Virginia	20	260	429
North Carolina	90	810	1,701
South Carolina	17	170	502
Georgia	33	294	800
Ohio	115	1,886	2,735
Indiana	380	5,320	7,448
Illinois	250	4,125	5,362
Michigan	900	13,500	17,280
Wisconsin	525	8,295	11,032
Minnesota	522	7,830	10,179
Iowa	70	1,113	1,469
Missouri	60	720	1,080
North Dakota	1,945	15,560	18,828
South Dakota	500	6,500	8,125
Nebraska	408	6,650	7,648
Kansas	200	2,520	3,553
Kentucky	62	744	1,302
Tennessee	31	279	558
Alabama	4	38	99
Texas	7	119	199
Oklahoma	25	350	525
Arkansas	3	28	56
Montana	68	272	503
Wyoming	28	252	454
Colorado	143	1,258	1,635
Utah	18	126	252
Idaho	9	135	236
Washington	20	240	444
Oregon	60	582	1,106
United States	7,063	88,478	119,041

HAY (TAME)

State	Acreage	Production	Total farm value
	Acres	Tons	Dollars
Maine	1,120	1,456	27,227
New Hampshire	450	675	16,200
Vermont	910	1,456	29,266
Massachusetts	410	656	17,712
Rhode Island	57	86	2,752
Connecticut	340	544	16,429
New York	4,386	6,579	134,870
New Jersey	325	488	14,201
Pennsylvania	2,978	4,318	103,632
Delaware	82	105	2,730
Maryland	450	630	15,120
Virginia	1,100	1,650	39,105
West Virginia	810	1,215	31,104
North Carolina	800	1,040	25,168
South Carolina	275	358	11,098
Georgia	557	613	15,509
Florida	113	141	3,243
Ohio	2,879	3,973	86,611
Indiana	2,200	3,080	66,528
Illinois	3,250	4,810	102,934
Michigan	2,650	3,180	74,412
Wisconsin	2,677	4,738	96,181
Minnesota	2,000	3,800	55,100

HAY (TAME)—Continued

State	Acreage	Production	Total farm value
	Acres	Tons	Dollars
Iowa	3,140	5,181	90,149
Missouri	2,810	3,794	73,983
North Dakota	605	908	12,803
South Dakota	890	1,558	21,033
Nebraska	1,769	4,299	60,186
Kansas	1,832	4,507	71,211
Kentucky	1,115	1,561	39,649
Tennessee	1,280	1,792	48,384
Alabama	1,367	1,367	30,484
Mississippi	405	648	13,284
Louisiana	250	450	10,350
Texas	662	1,258	22,644
Oklahoma	700	1,540	23,254
Arkansas	550	770	15,785
Montana	752	827	19,021
Wyoming	605	853	19,619
Colorado	1,065	2,396	44,326
New Mexico	235	646	11,757
Arizona	169	676	13,520
Utah	453	938	20,542
Nevada	225	526	10,310
Idaho	650	1,625	35,750
Washington	794	1,906	43,838
Oregon	854	1,452	27,733
California	2,352	4,257	73,220
United States	56,348	91,326	1,839,967

TOBACCO BY TYPES AND DISTRICTS

I.—Cigar Types

District	Acreage	Production	Total farm value
	Acres	Pounds	Dollars
New England	35.0	54,400	25,187
New York	3.7	3,483	784
Pennsylvania	41.0	54,120	9,200
Ohio-Miami Valley	40.0	40,000	6,000
Wisconsin	48.0	60,960	13,533
Georgia and Florida	6.2	5,890	3,210
Total cigar types	172.9	218,853	57,914

II.—Chewing, Smoking, Snuff, and Export Types

Burley	313.0	262,920	146,609
Paducah	137.8	110,240	26,458
Henderson	106.5	87,330	17,466
One-sucker	47.5	37,050	6,132
Clarksville and Hopkinsville	126.0	100,800	26,006
Virginia sun-cured	13.0	8,320	2,271
Virginia dark	70.0	47,600	14,280
Old Bright	395.0	201,450	114,020
New Bright	463.0	277,800	118,065
Maryland and eastern Ohio export	33.5	24,120	6,874
Louisiana Perique	.4	174	113
Total chewing, smoking, snuff, and export types	1,705.7	1,157,804	478,294
All other	22.6	12,801	6,339
Total	1,901.2	1,389,458	542,547

RICE

State	Acreage	Production	Total farm value
	Acres[1]	Bushels[2]	Dollars[2]
North Carolina..	400	10	28
South Carolina..	3,700	90	270
Georgia.....	1,200	29	80
Florida.....	2,000	42	110
Missouri.....	600	23	55
Alabama.....	600	16	43
Mississippi.....	3,300	96	182
Louisiana.....	560,000	19,712	53,420
Texas.....	218,000	6,998	19,594
Arkansas.....	158,000	6,162	14,789
California.....	142,000	7,881	21,042
United States..	1,089,800	41,059	109,613

[1] Figures in full (000 not omitted).
[2] (000 omitted).

Statistics of other products not included in the tables above are as follows: peanuts, 1,251,400 acres, production 33,263,000 bushels, value $79,839,000; beans, 1,018,000 acres, production 11,488,000 bushels, value $49,181,000; sweet potatoes, 1,029,000 acres, production 103,579,000 bushels, value $138,085,000; hops, 23,900 acres, production 29,346,000 pounds, value $22,656,000. The total value of thirteen crops in all the States in 1919 was $12,421,342,000. The total value of live stock on the farms in 1920 amounted to $8,566,313,000.

AGRICULTURE, DEPARTMENT OF, an executive department of the United States Government, established by Congress in 1889; originally a bureau. It disseminates throughout the United States, by daily, monthly, and annual reports, the latest and most valuable agricultural information and introduces and distributes new and desirable seeds, plants, etc. It includes the Weather Bureau, Bureau of Animal Industry, a herbarium, a museum, a laboratory, propagating gardens, a library, and other useful adjuncts. There are now 60 experimental stations established in every State.

AGRIGENTUM (ag-rē-jen'tum), the modern Girgenti, a town on the S. coast of Sicily, founded by a colony from Gela in 582 B. C., and in the earlier ages one of the most important places in the island. After being at first free, it was utterly demolished by the Carthaginians in 405 B. C. In the course of the Punic Wars it was compelled to submit to the Romans. From 827 to 1080 A. D. it was in the possession of the Saracens, from whom it was conquered by Count Roger Guiscard. The modern Girgenti still shows numerous and splendid ruins. Empedocles was born here.

AGRIPPA II., HEROD, tetrarch of Abilene, Galilee, Iturea, and Trachonitis, born in 27 A. D. During his reign he enlarged Cæsarea Philippi and named it Neronias, in honor of Nero. He remained faithful to the Romans, and tried to dissuade the Jews from rebelling. After the fall of Jerusalem he retired to Rome, where he died in 100 A. D. Before him the Apostle Paul made his memorable defense (Acts xxvi).

AGUAS CALIENTES (ag'waz kal-yān'taz), a town of Mexico, capital of a central State of the same name, with an area of 2,900 square miles and a population of about 125,000, stands on a plain 6,000 feet above the sea-level, 270 miles N. W. of the City of Mexico. The environs abound in hot springs, from which the town takes its name. Pop. about 50,000.

AGUE, an intermittent fever, in whatever stage of its progress or whatever its type. Marsh miasma, or the effluvia arising from stagnant water, or marshy ground, when acted upon by heat, are the most frequent causes of this fever. One peculiarity of this fever is its great susceptibility of a renewal from very slight causes, as from the prevalence of an easterly wind, even without the repetition of the original exciting cause.

AGUILAR, GRACE (ä-gē-lär'), an English novelist; born at Hackney, June 2, 1816; was the daughter of Jewish parents of Spanish origin. Her first books were in defense of the Jewish religion: "The Spirit of Judaism" (1842); "The Jewish Faith," etc. She is best known by her domestic and sentimental novels, "Home Influence" (1847); "The Vale of Cedars" (1850), and "The Days of Bruce" (1852). She died in Frankfort-on-the-Main, Sept. 16, 1847.

AGUINALDO, EMILIO, a leader of the insurgents in the Philippines insurrection of 1896, and their chief in the Spanish-American War of 1898. A Chinese mestizo (of Chinese and Tagalog parentage), he was born in Imus, in the province of Cavité, in Luzon, in 1870. His father was a planter and he received his early education at Catholic colleges, and studied medicine. In 1888 he had some trouble with the authorities and went to Hong Kong. On the outbreak of the rebellion against Spanish authority, in 1896, Aguinaldo became a commanding figure with the insurgents. He was at the head of the diplomatic party, which succeeded in making terms with the Spanish Government, the latter paying a large sum to the Philippine leaders to lay down their arms. Aguinaldo quar-

reled with his associates in Hong Kong over the division of this money, and went to Singapore, where he came in contact with the United States consul, shortly before the breaking out of the war between the United States and Spain. On the representations of the consul Commodore Dewey telegraphed to have Aguinaldo sent to him. Aguinaldo was given opportunity to organize the Filipinos against the Spanish authority; but no promises were made to him and the insurgents were never officially recognized by the Americans. Friction early arose and the Americans protested against the cruel treatment of Spanish prisoners by the Filipinos. The strain became serious at the capture of Manila, the insurgents claiming the right to sack the city, which the Americans denied. On June 12, 1898, Aguinaldo organized a so-called Filipino Republic, with himself as president, but very soon proclaimed himself dictator. He protested against the Spanish-American treaty of peace, which ceded the Philippine Islands to the United States, and claimed the independence of the islands. He organized an extensive conspiracy among the native population of Manila, and ordered the complete massacre of the Americans, together with the entire European population. The plot was discovered in time and failed. On Feb. 4, 1899, his forces attacked the American lines in the suburbs of Manila. The news of this overt action caused the prompt ratification of the Spanish-American treaty by the United States Senate. Aguinaldo made a determined resistance to the Americans, but early in 1900 the organized insurrection was broken up, Aguinaldo driven into hiding by General Funston, who also captured the rebel himself in March, 1901. Aguinaldo then declared his allegiance to the American flag.

AGULHAS (ag-öl'äs), **CAPE**, the most southern point of Africa, lies about 100 miles E. S. E. of the Cape of Good Hope, lat. 34° 49′ S., long. 20° 0′ 40″ E. The point is very dangerous for ships. In 1849, a lighthouse was erected on the point. The Agulhas bank extends along the whole southern coast of Africa, from near Natal to Saldanha Bay.

AHAB, son of Omri, seventh king of the separate kingdom of Israel. He was married to Jezebel, whose wickedness instigated him to the commission of acts of cruelty and idolatry. He was slain by an arrow in a war with the Syrians.

AHASUERUS, or **AHASHVEROSH**, the name of the Persian monarch whose story is recorded in the Book of Esther. He is probably the same king as the Artaxerxes Longimanus of the Greek historians, whose reign commenced B. C. 465.

AHMADABAD, chief town of a district in Guzerat, India, second among the cities of the province of Bombay. It was built in the year 1412 by Ahmad Shah, and finally came under the power of the British in 1818. Its architectural relics are gorgeous, even in the midst of decay, and illustrate the combination of Saracenic with Hindu forms, mainly of the Jain type. The Jama Masjid, or great mosque, rises from the center of the city, and is adorned by two superbly decorated minarets. There is likewise an ivory mosque, so called because, although built of white marble, it is lined with ivory, and inlaid with a profusion of gems. It is famous for its manufacture of rich fabrics of silk and cotton, brocades, and articles of gold, silver, steel, and enamel. The pottery is very superior; and paper of various sorts is largely manufactured chiefly from jute. Pop. about 250,000. The district, mainly a great alluvial plain, has an area of 3,821 square miles and a population of about 900,000.

AHMED MIRZA, Shah of Persia, born in 1898. He succeeded his father, Mohammed Ali, when the latter was deposed from the throne on July 16, 1909.



AHMED MIRZA

On account of his youth when he became shah, he was not able to take an active part in the administration of his government during the first years of his reign, but he gradually acquired the ability to

rule with increasing years and during the troubled days of the World War carried on the affairs of the state as efficiently as possible under the circumstances. In 1920 he visited France and other European countries. See PERSIA.

AHRIMAN, a Persian deity, the demon or principle of evil, the principle of good being Oromasdes, or Ormuzd.

AI, a species of sloth, the *bradypus tridactylus* of Linnæus. As its name implies it has three toes, or rather nails, on each foot, in this respect differing from the unau (*bradypus didactylus* of Linnæus), which has but two. It is of the order edentata, or toothless mammals. It is the only known species of its class which has as many as nine cervical vertebræ, seven being the normal number. It is about the size of a cat. The tail is very short. The limbs also are short, but exceedingly muscular. It clings with extraordinary tenacity to the branches of trees. It inhabits America, from Brazil to Mexico.

AID-DE-CAMP, AIDE-DE-CAMP, or sometimes simply **AID** or **AIDE**, an officer who receives the orders of a general and communicates them.

AÏDÉ, HAMILTON (ä-ē-dā'), an English novelist and poet; born in Paris, France, in 1830. He was educated at Bonn, and became an officer in the British army. His poems include "Eleanore and Other Poems" (1856); "The Romance of the Scarlet Leaf, and Other Chronicles and Reminiscences" (1856), a masterly description of Russian family life; "The Childhood of Bragoff, the Grandson" (1858). He died in 1906.

AIKEN, town and county-seat of Aiken co., S. C., on the Southern railway; 17 miles E. of Augusta, Ga. It is a noted winter health resort, especially for consumptives; contains Aiken Institute, the Schofield Normal School, and the Immanuel Training and High School; and has banks, newspapers, manufactories, and large cotton trade. Pop. (1910) 3,911; (1920) 4,103.

AILANTHUS, or **AILANTUS**, a genus of plants belonging to the order of *simarubaceæ*. The glandulosa, called tree of heaven or Chinese sumach, a native of Mongolia and Japan, has very large, unequally pinnate leaves and unpleasant-smelling flowers. In Japan it affords nourishment to a fine silkworm. The silk produced is coarser, but more durable than mulberry silk. It was first brought to the United States in 1784. During the first half-dozen years it outstrips almost any other deciduous tree in vigor of growth, and leading stems grow 12 to 15 feet in a single season. In four or five years, therefore, it forms a bulky head, but after that period it advances more slowly. In the United States it is planted purely for ornament; but in Europe its wood has been applied to cabinet work.

AINSWORTH, FREDERICK CRAYTON, an American soldier, born in Woodstock, Vt., in 1852. He studied medicine at the Medical College of New York and was appointed assistant surgeon in the army in 1874. He was promoted to various grades until in 1892 he became a colonel and Chief of the Record and Pension Office. He was appointed Brigadier-General in 1899 and Major-General and Military Secretary in 1904, and Major-General and Adjutant-General of the United States in 1907. He was retired at his own request in 1912. He was an efficient administrator of the Adjutant-General's office, and introduced many improved methods of carrying on the business of the War Department.

AINSWORTH, WILLIAM HARRISON, an English novelist; born in Manchester, Feb. 4, 1905. Educated in Manchester, he went to London, edited "Bentley's Magazine" in 1840, "Ainsworth's Magazine" (1842-1853), and the "New Monthly Magazine." He wrote 250 novels and enjoyed enormous popularity. His books are still read for their vivacious narratives and powerful descriptions. The most widely known among them is probably "Jack Sheppard" (1839). He died in Ryegate, Jan. 3, 1882.

AINTAB, a town in Syria in the vilayet of Aleppo. Prior to the treaty of peace with Turkey in 1920, the town belonged to Turkey. It has military importance and is provided with strong fortifications. Before the war it had an important trade in leather and cotton. Pop. about 45,000, which is made up for the most part of Armenian and Greek Christians. In April and May, 1920, the city was attacked by Turkish forces and many of its inhabitants were killed and most of the others were driven from the city. The French force which was defending the town withdrew, leaving it defenseless. There were present at the time several American missionaries who, however, escaped from the city without injury.

AIR, the gaseous substance which fills the atmosphere surrounding our planet. It is elastic, and is destitute of taste, color, and smell. It contains by weight, oxygen, 23.10 parts, and of nitrogen, 76.90; and by volume, of oxygen, 20.90,

and of nitrogen, 79.10; or of 10,000 parts, there are, in perfectly dry air, of nitrogen, 7,912, oxygen, 2,080, carbonic acid, 4, carburetted hydrogen, 4, with a trace of ammonia. But air never is dry; it has always in it a varying amount of watery vapor.

The density of air being fixed at the round number 1,000, it is made the standard with which the specific gravity of other substances is compared. If water be made unity, then the specific gravity of dry air is .0012759. At 62° Fahr. it is 810 times lighter than water, and 11,000 times lighter than mercury. At the surface of the sea, the mean pressure is sufficient to balance a column of mercury 30 inches, or one of water 34 feet, in height.

Air, in music, is a piece composed of a certain number of melodious phrases, united in a regular symmetrical form, and terminating in the key in which it began.

AIR-BRAKE, a mechanical device for regulating the speed of railroad trains and for stopping them. In the course of its development, the air-brake has been known in three different forms—the straight air-brake, the automatic air-brake and the quick-action automatic air-brake, each in its turn fulfilling the requirements of its day and laying the foundation for the succeeding form.

The straight air-brake was the easiest and simplest form and was introduced by Mr. Westinghouse about the year 1869.

The automatic air-brake, introduced by Mr. Westinghouse in 1873, was designed to remedy the defects of the earlier system and to meet the advancing requirements of the time. The apparatus consisted of that already employed in the straight air-brake system, with the addition upon each vehicle of a storage reservoir, of sufficient capacity to supply the brake cylinder upon that vehicle, and a valve mechanism, called a triple valve, operated by variations in the air pressure in the train pipe, to control the operation of the brake cylinder. This triple valve was placed in the branch pipe leading from the train pipe to the brake cylinder, and was also supplied with a pipe leading to the new storage reservoir. It was called a triple valve because it performed the three functions of (1) permitting air to flow from the train pipe into the storage reservoir, for the purpose of charging the latter with air pressure; (2) permitting the compressed air to flow from the reservoir into the brake cylinder, for the purpose of applying the brakes, and (3) permitting the compressed air to flow from the brake cylinder to the atmosphere to remove the pressure from the brake cylinders and thereby release the brakes. The storage reservoir upon the locomotive became thereafter known as the main reservoir, and those upon the individual cars became known as auxiliary reservoirs. The characteristic feature of the automatic air-brake is the triple valve, under the immediate control of which are all the operations of the brakes upon individual cars.

The automatic air-brake is applied by an operation of the triple valve which results from the discharge of air from the train pipe to the atmosphere. The application of the brakes need not be confined to the manipulation of the operating valve by the engineer, but will result from any cause by which the train-pipe air pressure may become sufficiently reduced. It was this feature of the apparatus which gave it the designation automatic. Should any portion of the train become detached, or should the train pipe or hose become ruptured, a reduction of air pressure in the train pipe immediately follows, and the brakes become automatically applied upon all the cars of the train. The importance of this feature of the automatic brake is very marked. Of all the operations of the air-brake apparatus, the necessity of prompt and reliable action, when the full retarding effect of the brakes is needed, stands pre-eminent. Of all the various manipulations of the air pressure, that of permitting the air pressure in the train pipe to be discharged to the atmosphere is the simplest and most surely attainable. In this way the prompt response of the brake apparatus, when emergency calls for its operation, is most fully assured, and the automatic air-brake has, therefore, taken a most conspicuous place in the front rank of railroad safety appliances. No accidental disorder of the apparatus can prevent the application of the brakes in emergencies. By means of the engineer's operating valve, or of a valve called the conductor's valve, connected with the train pipe in each passenger car, or by the occurrence of any disorder which dissipates the air pressure in the train pipe, the apparatus automatically causes the train to come to a stop—in the latter case calling attention to the disorder and giving opportunity for such repair as shall again insure safety before the train proceeds.

The automatic air-brake was very generally adopted for the passenger trains of all important railroads, and fully met all the requirements of its day. When, however, in the development of railroad transportation, the necessity for the use of an automatic power brake upon freight

trains became apparent, new conditions were discovered which the automatic air-brake was not qualified to meet.

It was clearly evident that the usefulness of the automatic air-brake upon freight trains became contingent upon the discovery of some means whereby the interval of time elapsing between the application of the brakes upon the cars of the forward end of the train and of those at the rear end of the train could be so diminished that no damaging shocks should result from any operation of the brakes. An examination of the conditions of operation made it equally evident that but two methods could be utilized for securing a more nearly simultaneous application of the brakes to all the cars, one of which is to reduce the air pressure in the train pipe so gradually that such reduction is nearly uniform throughout the train, and the other is to provide a series of openings in the train pipe, in addition to that through the engineer's brake valve, so that the train pipe air may be discharged at different points throughout the train at approximately the same time. While the first of these two methods proves entirely satisfactory for ordinary application of the brakes in regular service, so much time is occupied by it that it is wholly unsuitable for applying the brakes when emergencies require prompt and efficient action. The second method, therefore, became the only practical solution of the use of the compressed air-brake as an effective safety appliance upon freight trains.

The quick-action air-brake was introduced by Mr. Westinghouse about 1888, and was the result of the development of this principle.

The quick-action automatic air-brake system virtually consists of two distinct brake systems, one of moderate power and smooth and gentle application for all the customary operations of everyday train service, and the other of high power and violent application for use only when emergencies require most energetic means to avert destruction of life and property. It has practically succeeded all other forms of power brake upon railroad trains, and in 1900 was in use upon about 1,000,000 cars.

It has already been noted that the condition which determines whether a service or an emergency application of the brakes will result from a reduction of the air pressure in the train pipe is the rate of rapidity or the suddenness with which the reduction of the air pressure in the train pipe takes place. When the air pressure in the train pipe is reduced comparatively slowly, the leftward movement of the triple valve piston is terminated by the resistance of the spring supporting the stem in such a position that the compressed air of the auxiliary reservoir becomes discharged into the brake cylinder, thereby reducing the air pressure of the auxiliary reservoir (which acts upon the right face of the triple valve piston) co-ordinately with the continued reduction of the air pressure in the train pipe (acting upon the left face of the piston), so that such a preponderance of air pressure upon the right face of the piston, as is necessary to compress the spring of the stem, does not occur. It is only when the air pressure, acting upon the left face of the triple valve piston, is reduced much more rapidly than the discharge of auxiliary reservoir air to the brake cylinder, will permit the air pressure upon the right face of the piston to be reduced, that the piston makes its complete movement to the left and causes a quick application of the brakes throughout the train. It is necessary, therefore, that the engineer's brake operating valve shall be provided with such means as shall readily enable the engineer to discharge air from the train pipe with only such rapidity as shall result in a service application, or to discharge the air with such greater rapidity as shall cause the emergency application of the brakes.

It is found also that, inasmuch as it is necessary to elevate the air pressure in the train pipe as rapidly as possible, to a point somewhat above the pressure of the air remaining in the auxiliary reservoirs after an application of the brakes, in order to force the triple valve piston to the right and release the brakes, the provision of a stored pressure in the main reservoir upon the locomotive, higher than that ordinarily charged into the train pipe and brake apparatus, is very desirable for temporary use in effecting a prompt release of the brakes. It has thus occurred that the primitive three-way cock, used for an engineer's brake operating valve, with the earlier forms of the air-brake, has given place to a more complicated device, now employed for effecting the various operations of the quick-action air-brake.

The functions of the modern engineer's brake valve may be enumerated as follows: To supply air to the train pipe and the auxiliary reservoirs throughout the train, at a certain definitely determined pressure for the proper operation of the brakes, the standard pressure adopted for this purpose by the railroads being 70 pounds; to discharge air from the train pipe to the atmosphere at such a rate of rapidity that all the applications

of the brakes in customary service may be effected without the operation of the quick-action mechanism of the triple valves; to maintain any reduced train pipe air pressure resulting from an application of the brakes, so that the brakes may be kept applied with the force corresponding to such reduced train pipe pressure; to discharge air from the train pipe to the atmosphere with such rapidity, in emergency applications of the brakes, as shall cause the quick-action mechanism of the triple valves to operate with certainty; and to temporarily supply the train pipe with an unusually high air pressure whenever the brakes are to be released. These various operations are in practice controlled by different positions of a rotary disk valve, the various positions of which are defined and secured by the movement of a handle operated by the engineer.

For detailed descriptions of the operation of the air-brake consult "The Development of the Electro-Pneumatic Brake," and other publications of the Westinghouse Air-Brake Company.

AIRD, SIR JOHN, an English engineer; born in 1833. In his earliest years he exhibited remarkable skill in mechanics and when only 18 years old carried on important engineering work in connection with the Exhibition of 1857. He constructed many large projects in England and elsewhere, but is best known as the builder of the great Assuan Dam. Under his direction the dam was completed twelve months earlier than the contracted time. He was a member of Parliament from 1887 to 1905. He was created a baronet in 1901. He died in 1911.

AIR-GUN, an instrument designed to propel balls by the elastic force of condensed aid. A strong metal globe is formed, furnished with a small hole and a valve opening inward. Into this hole a condensing syringe is screwed. When, by means of this apparatus, the condensation has been brought to the requisite point of intensity, the globe is detached from the syringe and screwed at the breech of a gun, so constructed that the valve may be opened by means of a trigger. A ball is then inserted in the barrel near the breech, so fitting it as to render it air-tight, and, the trigger being pulled, the elasticity of the condensed air impels it with considerable force.

AIR-PUMP, an instrument invented by Otto von Guericke of Magdeburg, in 1650. It was designed to exhaust the air from a receiver. The air-pump now generally in use is a considerable improvement. A bell-formed receiver of glass is made to rest on a horizontal plate of thick glass ground perfectly smooth. In the center of that plate, under the receiver, is an opening into a tube which, passing for some distance horizontally, ultimately branches at right angles into two portions, entering two upright cylinders of glass. The cylinders are firmly cemented to the glass plate, and within them are two pistons fitting them so closely as to be air-tight. Each piston is worked by a rack and pinion, turned by a handle; while each cylinder is fitted with a valve, so contrived that, when the piston is raised, communication is opened between the cylinder and the receiver, which communication is again closed as the piston falls. It is evident that when anyone commences to work the machine, the air in the cylinders will be immediately expelled the first upward motion that they are made to take. The valve will then fly open, and the air from the receiver will fill both the cylinders as well as itself, though, of course, now in a somewhat rarefied state. As the same process is again and again repeated, the air will become increasingly rarefied, though, as stated above, an actual vacuum never can result from the action now described.

AIR-PUMP GAUGE, a gauge for testing the extent to which the air has been exhausted in the receiver of an air-pump. It consists of a glass tube bent like a siphon. One leg is closed, as in a barometer, the other open. It is placed under a small bell jar communicating by a stopcock with the receiver, and the more nearly the mercury stands at the same level the more nearly has a vacuum been produced.

AIR-SHIPS. See AERONAUTICS.

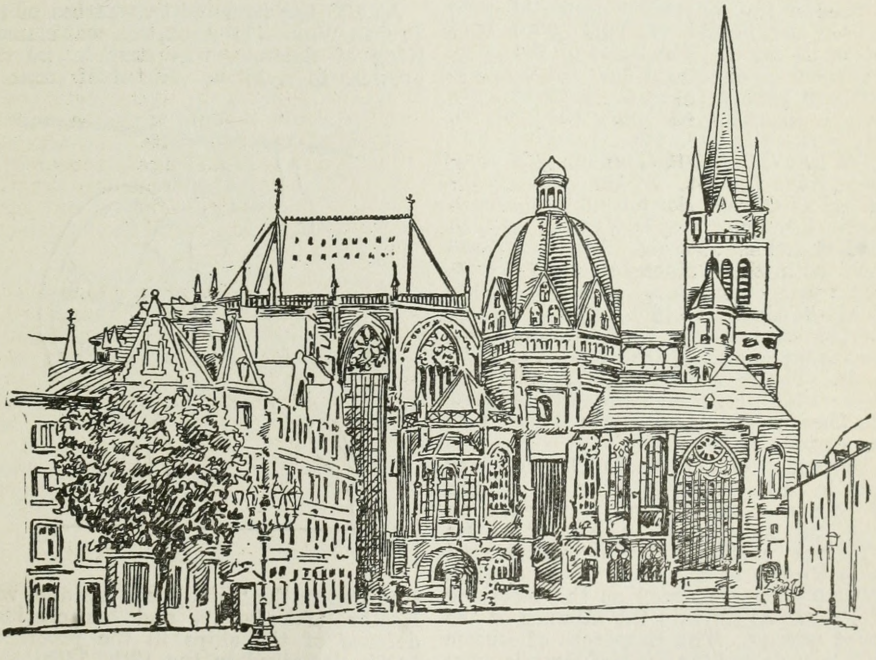
AISNE, a river in France rising in the forest of the Argonne and flowing first N. W. and then W. to a junction with the Oise near Compiègne. It is about 170 miles long and is navigable over one-half its length. Canals connect it with the Meuse and the Marne rivers. The Aisne and the country through which it runs formed the most prominent field of operation during the World War. The northern banks of the river were fortified by the Germans against a failure of their initial attempts to capture Paris in 1914, and following their defeat at the Marne the German armies fell back to these defenses. It constituted during the greater part of the war the northern limit of their possession of French soil. Much of the bitterest fighting during the

war took place on the banks of the Aisne or in the country tributary to it. The battles of the Aisne constitute a very important chapter in the history of the World War. See WORLD WAR.

AITKEN, ROBERT GRANT, an American astronomer; born in Jackson, Cal., in 1864. He graduated from Williams College in 1887. In the following year he became instructor of mathematics of Livermore College, California. From 1891 to 1895 he was professor of mathematics and astronomy at the University of the Pacific. He was appointed astronomer at the Lick Observatory in 1895, and has to his credit the discovery of about three thousand double stars. He was awarded prizes and medals by many American and foreign scientific societies. He was editor of "Publications of the Astronomical Societies of the Pacific," and contributed much to astronomical and other scientific journals.

AITKEN, ROBERT INGERSOLL, an American sculptor; born in San Francisco and was professor of sculpture at public schools, studied art at the Mark Hopkins Institute of Art in San Francisco and was professor of scupture at this institution from 1901 to 1904. He showed remarkable talent in the making of portrait busts. Among those which he executed were busts of Mme. Modjeska, Augustus Thomas, William H. Taft, Henry Roger Wolcott, and others. He also designed many important monuments, including the McKinley Monument in Golden Gate Park in San Francisco, the Bret Harte Monument in San Francisco, etc. He was awarded many medals for his work and became secretary of the National Sculpture Society, and a member of many American and foreign societies relating to art and sculpture.

AIX-LA-CHAPELLE (āx'lä-shäp-el') (German Aachen), the capital of a district in Rhenish Prussia. Pop. about 175,000. Aix-la-Chapelle is the center of a valuable coal district, and of numerous thriving manufactories, especially for spinning and weaving woolen fabrics, and for needle and pin making. There are also immense manufactures of machinery, bells, glass buttons, chemicals and cigars. The city is rich in historical associations. It emerged from historical obscurity about the time of Pepin; and Charlemagne founded its world-wide celebrity. Whether it was his birthplace is doubtful, but in 814 it became his grave. In 796 he had rebuilt the imperial palace, as well as the chapel in which Pepin had celebrated Christmas in 765. The present town-house was built in 1353



THE CATHEDRAL AT AIX-LA-CHAPELLE

on the ruins of the palace. The ancient cathedral is in the form of an octagon, which, with various additions round it, forms on the outside a sixteen-sided figure. In the middle of the octagon, a stone, with the inscription "Carolo Magno," marks the site of the grave of Charlemagne. In 1215 Frederick II. caused the remains of the emperor to be inclosed in a costly shrine. The columns brought by Charlemagne from the palace of the Exarch at Ravenna, to decorate the interior of the octagon, had been carried off by the French; but most of them were restored at the Peace of Paris, and replaced in 1846. The town-house contains the coronation hall in which 35 German emperors and 11 empresses have celebrated their coronation banquet. The emperors were crowned in Aix-la-Chapelle from Louis the Pious to Ferdinand I. (813-1531). Seventeen imperial diets and 11 provincial councils were held within its walls. The name of the place is derived from the springs, for which it has been always famous. They are efficacious in cases of gout, rheumatism, cutaneous diseases, etc. In 1793, and again in 1794, Aix-la-Chapelle was occupied by the French. By the treaties concluded at Campo Formio and Lunéville, it was formally ceded to France, until in 1915 it fell to Prussia. The town has been the meeting place for many important peace congresses. The first Peace of Aix-la-Chapelle (1668) ended the war carried on between France and Spain for the possession of the Spanish Netherlands. The second Peace of Aix-la-Chapelle (1748) concluded the war respecting the succession of Maria Theresa to the empire.

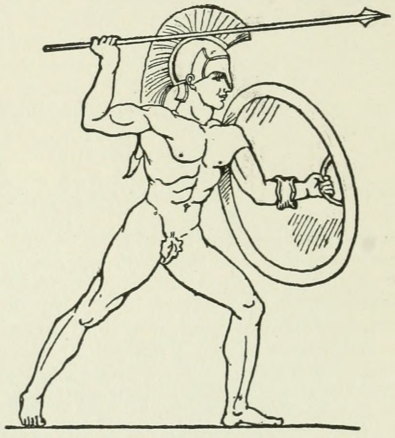
The Congress of Aix-la-Chapelle was held in 1818, for regulating the affairs of Europe after the war. It began on Sept. 30, and ended on Nov. 21. Its principal object was the withdrawal from France of the army of occupation, 150,000 strong, as well as the receiving of France again into the alliance of the great powers. The Emperors of Russia and Austria and the King of Prussia were present in person. The five great powers assembled signed a protocol announcing a policy known as that of the "Holy Alliance." During the World War the city played an important part as a German depot, due to its nearness to the western front. As a result of the armistice Belgian troops occupied the city in December, 1919.

AIX-LES-BAINS (āx'lā-ban'), a town of France, in Haute Savoie, on the E. side of Lake Bourget, 8 miles N. by E. of Chambéry, celebrated for its sulphuretted hot springs. They were in vogue among the Romans, and are still extensively used. Pop. about 5,000.

AJACCIO (ä-yätch'yō), the chief town of the island of Corsica, which forms a department of France. It is the handsomest city of Corsica, and the birthplace of Napoleon I., whose house is still to be seen. During the World War the city was a naval base for vessels of the Allied forces operating in the Mediterrean. Pop. about 20,000.

AJALON, said to be the modern Yâlo, a village a little to the N. of the Jaffa road, about 14 miles W. N. W. of Jerusalem; the town was rendered memorable by Joshua's victory over the five Canaanitish kings, and still more so by the extraordinary circumstance of the miraculously lengthened day.

AJAX, the name of two heroes of the Trojan War. (1) Ajax, son of Telamon, King of Salamis, was next in warlike prowess to Achilles. His chief exploits,



AJAX

recorded in the "Iliad," are his duel with Hector (7th book), and his obstinate defense of the ships in the protracted battle described in the 13th, 14th, 15th, 16th, and 17th books. After Achilles' death, the armor of that hero was to be given as a prize to him who had deserved best of the Greeks. Ajax and Ulysses alone advanced their claims, and the assembled princes awarded the splendid prize to Ulysses. Ajax was so much mortified at this that he went mad, and afterward slew himself. (2) Ajax, son of Oileus, remarkable for swiftness of foot and skill in using the bow and javelin. When the Greeks had entered Troy, Ulysses accused Ajax of having violated Cassandra in the temple of Pallas. He

exculpated himself with an oath; but the anger of the goddess at last overtook him, and he perished in the waves of the sea.

AKBAR (äk'bar) [*i. e.*, "the Great," his proper name being Jelal-el-din-Mohammed], Mogul Emperor of India, the greatest Asiatic monarch of modern times. His father, Humayun, was deprived of the throne by usurpers, and had to retire for refuge into Persia; and it was on the way thither, in the town of Amarkot, that Akbar was born in 1542. Humayun recovered the throne of Delhi after an exile of 12 years; but died within a year. The young prince at first committed the administration to a regent-minister, Beiram; but, finding his authority degenerating into tyranny, he shook it off at the age of 18 and took the power into his own hands. In 10 or 12 years Akbar's empire embraced the whole of India N. of the Vindhya mountains, but in southern India he was less successful. He promoted commerce by constructing roads, establishing a uniform system of weights and measures, and a vigorous police. He exercised the utmost vigilance over his viceroys of provinces and other officers to see that no extortion was practiced and that justice was impartially administered to all classes of his subjects. For a born Mohammedan, the tolerance with which he treated other religions was wonderful. He was fond of inquiries as to religious beliefs; and Portuguese missionaries from Goa were sent at his request to give him an account of the Christian faith. He even attempted to promulgate a new religion of his own. Literature received the greatest encouragement. Schools were established for the education both of Hindus and Mohammedans; and numbers of Hindu works were translated from Sanskrit into Persian. Akbar died in 1605.

AKED, CHARLES FREDERIC, a Baptist clergyman; born in Nottingham, England, in 1864. He was educated at the Midland Baptists' College and the University College, Nottingham, and entered the ministry in 1886. After serving as pastor in several places in England, he became pastor of Pembroke Chapel at Liverpool in 1890. Here he attracted great attention through his powerful sermons on social and religious subjects. He was called to the pastorate of the Fifth Avenue Baptist Church of New York in 1907, remaining there until 1911, when he became pastor of the First Congregational Church of San Francisco, where he remained until 1915. He was well known as a lecturer and preacher. He wrote "The Courage of the Coward" (1905), "Old Events and Modern Meanings" (1908), "The Divine Drama of Job" (1913).

À KEMPIS, THOMAS. See KEMPIS.

AKENSIDE, MARK, an English poet, born at Newcastle-on-Tyne, Nov. 9, 1721. Studied at first theology, then medicine in Edinburgh and in Leyden. He practiced medicine with poor success at first, but slowly gained eminence, and in 1761 was appointed physician to the queen. His literary fame rests on the "Pleasures of the Imagination," a didactic poem (1744, remodeled and enlarged 1757 and 1765). He died in London, June 23, 1770.

AKERS, BENJAMIN PAUL, an American sculptor, born in 1825. Studied in Florence and was especially noted for the rapidity of his work. His best known statues are "Una and the Lion," "Elizabeth of Hungary," "Morning," "Evening," "Diana and Endymion," "Paolo and Francesca," and "The Dead Pearl Diver." He died in May, 1866.

AKRON, city and county-seat of Summit co., O.; on the Baltimore and Ohio, the Erie, the Northern Ohio, and the Akron, Canton and Youngstown railroads, and the Ohio and Erie canal; 40 miles S. E. of Cleveland. It is surrounded by many fresh-water lakes; is the seat of Akron University (Universalist), and has several National banks, numerous manufactories, daily, weekly, and monthly periodicals. In the decade 1910-1920 the city increased its industrial importance greatly. It became the center of the rubber-making industry of the United States. Other industries, connected especially with the automobile industry, also became established. This condition is reflected in the greatly increased population. Pop. (1910) 69,067; (1920) 208,435.

AKRON, MUNICIPAL UNIVERSITY OF, an institution of higher learning in Akron, O., founded in 1872 as Buchtel College. In 1913 the college was transferred to the city of Akron as the nucleus of a municipal university, which came into existence on Jan. 1, 1914. The name of Buchtel College is retained for the College of Liberal Arts. There are departments of co-operative engineering and home economics. In 1919 there were in the university 454 students and 30 instructors. President P. R. Colby, Ph. D.

AKSU, a town of Chinese Turkestan, at the southern base of the Thian-shan mountains, formerly the capital of a separate khanate. In 1867 it became a

part of the state of Eastern Turkestan, under Yakub Beg, but was conquered again by China in 1877. It is celebrated for its manufactures of cotton cloth and saddlery, and is much resorted to by caravans, as an *entrepôt* of commerce between Russia, Tartary, and China. Pop. about 25,000.

AKYAB, a town of Burma, the chief seaport of Aracan, is situated on the eastern side of the island of Akyab, at the mouth of the Kuladan river, 190 miles S. E. of Calcutta. In 1826 it was chosen for the chief station of the province, and now is a great rice port. It is well built, with broad and regular streets. Savage Island, with a lighthouse, shelters the harbor. Pop. about 40,000.

ALABAMA, a State in the South Central Division of the North American Union; bounded by Tennessee, Georgia, Florida, Mississippi, and the Gulf of Mexico; gross area, 52,250 square miles; admitted into the Union, Dec. 14, 1819; seceded, Jan. 11, 1861; readmitted, June 25, 1868; number of counties, 67. Pop. (1900) 1,828,697; (1910) 2,138,093; (1920) 2,348,174. Capital, Montgomery.

Topography.—The surface is highest in the N. E., where the Blue Ridge range of the Appalachian mountains enters the State. South of this the surface is almost level, and consists of plains forming a gentle declivity toward the Gulf. The State comprises four distinctive belts: the cereal, mineral, cotton, and timber; the first covering 8 counties, the second 28, the third 17, and the fourth, the remainder. Among the valleys, those of the Tennessee, the Warrior, and the Coosa are the most important. The principal rivers are the Alabama, Tennessee, Mobile, Tombigbee, Black Warrior, and Chattahoochee. A number of others, rising in Alabama, have their outlets in Florida. Bays comprise the Grand, Bon Secours, Perdido, and Mobile, the last being one of the most important in the country.

Geology.—All of the formations of the Appalachian region are found in this State, which has three geological divisions: (1) the northern, showing subcarboniferous rock masses and coal measures; (2) the middle, metamorphic, and calcareous rocks, silurian sediments, and coal measures; and (3) the southern, drift beds over cretaceous and tertiary rocks.

Mineralogy.—The State has large wealth in its mineral resources, which include coal, iron, asbestos, asphalt, pottery and porcelain clays, marble, granite phosphates, natural gas, gold, silver, and copper. The most valuable of these at present are coal and iron. Alabama produces a large amount of coal and iron. The coal production, which is bituminous, was, in 1918, 21,280,000 short tons. The shipment of iron ore from the State in 1917 was 6,121,087 tons, valued at $15,334,561. The production for 1919 was valued at $21,280,000. In the production of iron Alabama ranks third, being surpassed only by Michigan and Minnesota. The State is also an important producer of cement, coke, and pig iron. The rapid development of its mineral resources in recent years has greatly increased the industrial importance of the State, as is indicated by the rapid growth of several cities, notably Birmingham. The total value of the mineral products of the State in 1917 was $65,371,469.

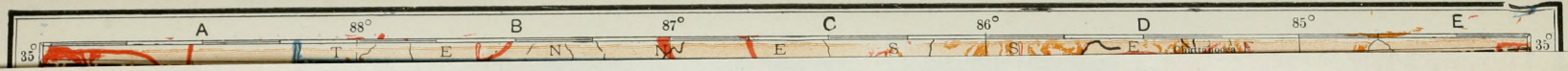
Soil.—In the S. part of the State the soil is a light alluvial and diluvial; in the central, the cotton belt, limestone and chalk lands predominate; and in the N. part, which contains the Tennessee valley, are exceedingly rich mineral lands. Besides the agricultural, mineral, and grazing lands, there are large tracts of valuable yellow pine forests.

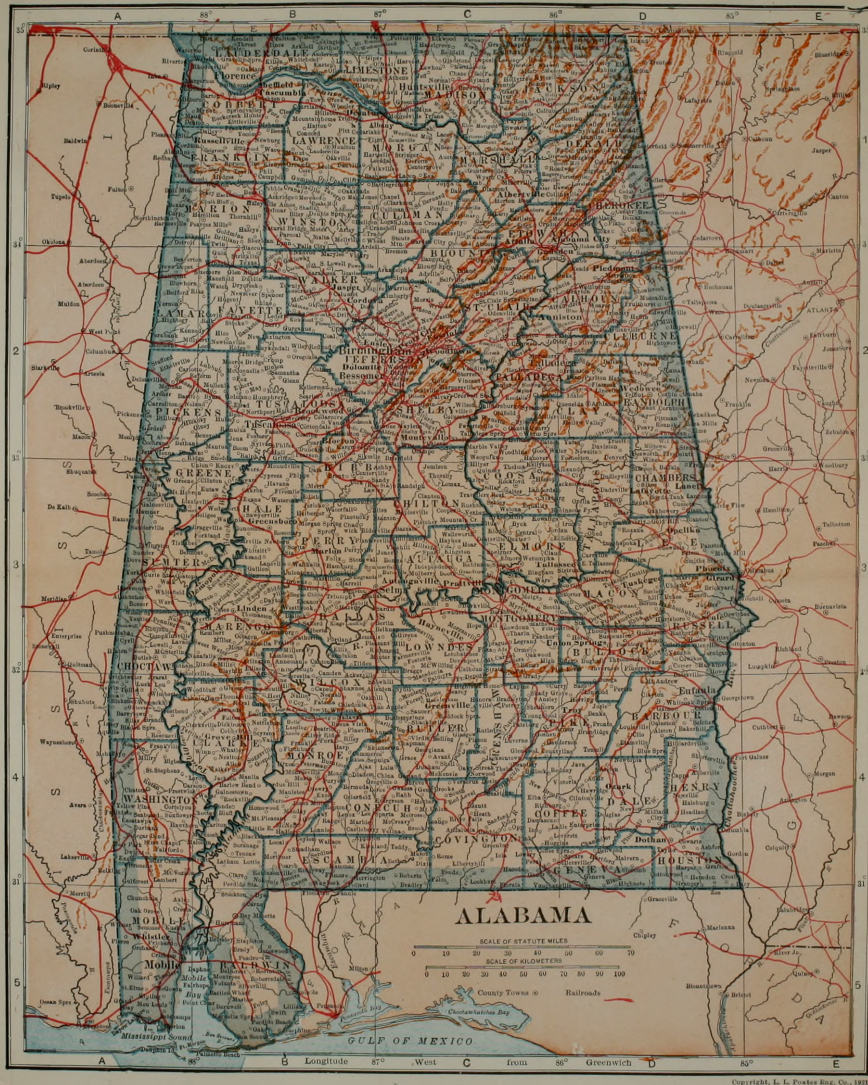
Agriculture.—The production and value of the principal crops in 1919 was as follows: Corn, 62,843,000 bushels, valued at $99,920,000; wheat, 1,242,000 bushels, valued at $3,043,000; oats, 6,696,000 bushels, valued at $7,031,000; tobacco, 1,890,000 pounds, valued at $567,000; rye, 38,000 bushels, valued at $99,000; rice, 16,000 bushels, valued at $43,000; potatoes, 3,520,000 bushels, valued at $7,568,000; sweet potatoes, 14,194,000 bushels, valued at $16,139,000; hay, 1,367,000 tons, valued at $30,484,000; cotton, 715,000 bales, valued at $124,410,000; peanuts, 6,840,000 bushels, valued at $14,911,000.

Manufactures.—In 1914 there were 3,242 manufacturing establishments, with an average of 78,717 wage earners. The capital invested was $227,505,000; value of materials, $107,412,000; and value of the finished product, $178,798,000.

Banking.—In 1919 there were 95 National banks in operation, having $10,825,000 in capital. There were also 261 State banks, with $10,877,000 in capital, $81,576,000 in deposits, and $101,700,000 in resources. The exchanges at the United States clearing-house at Birmingham aggregated $146,918,000 in the year ending Sept. 30, 1919.

Education.—Alabama, in common with other Southern States, has had great difficulty in developing its educational system. The common schools of the State are fairly well equipped, and nearly all counties are provided with high


A
88°
B
87°
C
86°
D
85°
E
35°
35°
T E N N E S S E E


ALABAMA
SCALE OF STATUTE MILES
0 10 20 30 40 50 60 70
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80 90 100
County Towns
Railroads
GULF OF MEXICO
Mississippi Sound
Mobile Bay
Choctawhatchee Bay
Longitude 88° West from Greenwich 85° E
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schools. The percentage of illiteracy is high, but is steadily decreasing. The large percentage of negro population accounts in a large measure for the low average of literacy. The school population is about 750,000. The total enrollment in the schools is about 450,000. There are about 8,000 teachers in schools for white children and about 3,000 in schools for colored children. The principal universities and colleges are the University of Alabama (opened 1831; non-sectarian); the Tuskegee Normal and Industrial Institute (1881); Birmingham Southern College, Woman's College of Alabama, Spring Hill College, Alabama Polytechnic Institute, Howard College, St. Bernard College, Judson College, Athens Female College.

Churches.—The strongest denominations numerically in the State are the Baptist; Methodist Episcopal, South; Roman Catholic; Methodist Episcopal; and the Protestant Episcopal.

Railroads.—The total railway mileage in the State in 1919 was 5,420. During the year there were built about 12 miles of main track. Recent developments in the coal, iron, and manufacturing industries have greatly stimulated railroad construction and extension.

State Government.—The governor is elected for a term of four years. Legislative sessions are held biennially and are limited to 50 days each. The Legislature has 35 members in the Senate and 106 in the House, each of whom receives $4 per day and mileage. There are 10 representatives in Congress. In politics, the State is strongly Democratic.

History.—Alabama was first settled by Bienville, in 1702. The region N. of 31°, which belonged to France, was ceded to Great Britain in 1763, transferred to the United States in 1783, and attached to South Carolina and Georgia till 1802, when it was organized as the Mississippi Territory. The region S. of 31°, which belonged to Spain, was seized and joined to Mississippi Territory in 1812, and with Florida was purchased from Spain in 1819. The great Creek Indian war of 1813-1814 was waged within the present limits of the State. After Alabama was admitted to the Union, it became one of the strongest slave-holding States in the Union. It was one of the first of the Southern States to favor secession, and Montgomery, its capital, became the first capital of the Southern Confederacy. During the Civil War its soil and waters were the scenes of memorable conflicts, especially the Federal naval operations against MOBILE (*q.v.*). Since the war, the State has had an era of uniform prosperity.

ALABAMA, a river in the State of Alabama, formed by the confluence of the Coosa and Tallapoosa above Montgomery, and uniting with Tombigbee to form the Mobile river; tortuous in its course; 312 miles long, navigable its entire length for small vessels, and for 60 miles of its lower course for vessels of 6-feet draft.

ALABAMA CITY, a city of Alabama in Etowah co. It is on the Louisville and Nashville, the Alabama Great Southern, the Nashville, the Chattanooga and St. Louis, and the Southern railroads. It is the center of an important agricultural region producing the chief varieties of grain. Coal is found in the vicinity. The city has a cotton mill and a steel foundry. Pop. (1910) 4,313; (1920) 5,432.

ALABAMA CLAIMS, a series of claims made in 1871 by the United States against the English Government for damages done to shipping during the Civil War, after a formal discussion between the two governments in 1865, and fruitless conventions for their settlement in 1868 and 1869. These damages were inflicted chiefly by the "Alabama," an armed vessel of the Confederate States, which was fitted out in a British port and permitted to sail in violation of existing international law. A tribunal, created in 1871 to pass upon these claims, held its sessions in Geneva, Switzerland, during the year 1872, and awarded the United States the sum of $15,500,000 in gold, in satisfaction of all claims at issue.

ALABAMA POLYTECHNIC INSTITUTE, a coeducational (non-sectarian) institution in Auburn, Ala., organized in 1872; reported in 1899: Professors and instructors, 31; students, 347; volumes in the library, 13,000; grounds and buildings valued at $136,500; productive funds, $253,500; income, $58,182; graduates, 522; president, W. Le Roy Broun, LL. D.

ALABAMA, THE, a Confederate cruiser which devastated American shipping during the Civil War. She was a bark-rigged steamer of 1,040 tons, built under secret instruction at Birkenhead, England. Her destination was suspected by the United States minister, but when orders for her detention were finally obtained, she had departed (July 31, 1862). She made for the Azores, where she was equipped and manned by an English crew, under the command of Capt. Raphael Semmes, of Maryland. She then proceeded to capture and burn vessels bearing the American flag, and

the destruction wrought in less than two years amounted to 65 vessels, and about $4,000,000 in property. In June, 1864, she put into Cherbourg, France, for repairs. Here she was intercepted by the Federal corvette "Kearsarge," Captain Winslow, and, after an hour's battle, Semmes surrendered. An account of her history is given in "Two Years on the Alabama," by Arthur Sinclair (1895).

ALABAMA, UNIVERSITY OF, organized in 1831; location, Tuscaloosa. Besides a curriculum of science and belles-lettres, it has a medical school at Mobile. In 1919 it had a teaching corps of 125 instructors and was attended by 1,800 students. It has 6,000 graduates. President, G. H. Denny, LL. D.

ALABASTER (from Greek *alabastros*, or the earlier form, *alabastos*), a tapering box, made for holding ointment; a rosebud; a measure of capacity, holding 10 ounces of wine or 9 of oil. The word is also applied to the mineral now called granular gypsum, and to any vessel made of it. Alabaster was named from Alabastron (near modern Antinoë), an Egyptian town.

In mineralogy, massive gypsum, either white or delicately shaded.

ALAGOAS, a maritime state of the republic of Brazil, bounded on the N. and W. by Pernambuco. The country is mountainous in the N. W., and low, marshy and unhealthy on the coast. The chief productions are the sugar-cane, cotton plant, manioc or cassava, ipecacuanha, maize, rice, etc., and also timber and dye-woods. Pop. (1917) 946,617. The town of Alagoas, once the capital, pop. about 50,000. The present capital is the port of Maceio.

ALAJUELA (äl-ä-whā'la), a city of of Costa Rica, Central America, 23 miles W. N. W. of Cartago. The same name is used for a state. Pop. (1917) state, 109,063; city, 6,481.

ALAMANNI, or ALEMANNI, LUIGI (äl-ä-mä'nē), an Italian poet and diplomatist, born in Florence, on Oct. 25, 1495. In 1522 he took part in a conspiracy against Cardinal Giulio de Medici, and after its discovery, fled to France, where he found protection with François I. In 1527 he reappeared in Florence, endeavored to obtain the protection of the emperor for the republic, but was compelled to flee the city. The Medici, on their return in 1532, declared him a rebel. He went back to France, where he served as ambassador for François I. to Henry II. He wrote "La Cultivazione" (1533), a book about agriculture. He also wrote love songs, epigrams, satires, comedies, translations, and various other things. He died April 18, 1556.

ALAMEDA, coextensive city and township in Alameda co., Cal.; on San Francisco Bay and the Southern Pacific railway; 11 miles E. S. E. of San Francisco. It is the seat of the College of Notre Dame (Roman Catholic); a popular summer resort, and the place of residence of many San Francisco business men. It has a State bank, electric light and street railway plants, the largest borax works in the world, extensive potteries, oil refineries, and ship-building yards. Pop. (1910) 23,383; (1920) 28,806.

ALAMO, THE, a mission church at San Antonio, in what is now Bexar co., Tex.; converted into a fort. In 1836 it was occupied by about 150 of the revolutionists in the Texan War of Independence. Though attacked by 4,000 Mexicans under Santa Ana, the Texans held it from Feb. 23 to March 6, when Santa Ana took it by storm. All but seven of the garrison perished, six of these being murdered after their surrender, and one man escaping to report the affair. In this garrison were the celebrated David Crockett and Col. James Bowie, inventor of the bowie-knife. The memory of this massacre became an incitement to the Texans in subsequent encounters, and "Remember the Alamo!" became a war-cry in their struggle for autonomy.

ALARCÓN, HERNANDO, a Spanish navigator; flourished in the 16th century; leader of an expedition to Mexico, which set sail in 1540. He proved that California was a peninsula and not an island, as had been previously supposed. He penetrated in boats a considerable distance up the Colorado river. On his return to New Spain he made a valuable map of the California peninsula.

ALARCÓN Y MENDOZA, DON JUAN RUIZ DE (ä-lär-kōn ē mān-dō'thä), a noted Spanish dramatist, born at Tasco, Mexico, about 1580 or 1590. He went to Spain in 1600 and became royal attorney in Seville. He was appointed reporter of the royal council of the Indies at Madrid about 1628. The last great dramatist of the old Spanish school, he may be considered also as the creator of the so-called character comedy. His principal works are: "The Weaver of Segovia"; "Suspicious Truth," the model for Corneille's "Liar"; "Walls Have Ears"; "The Proof of Promises"; "The Anti-Christ." He died in Madrid, Aug. 4, 1639.

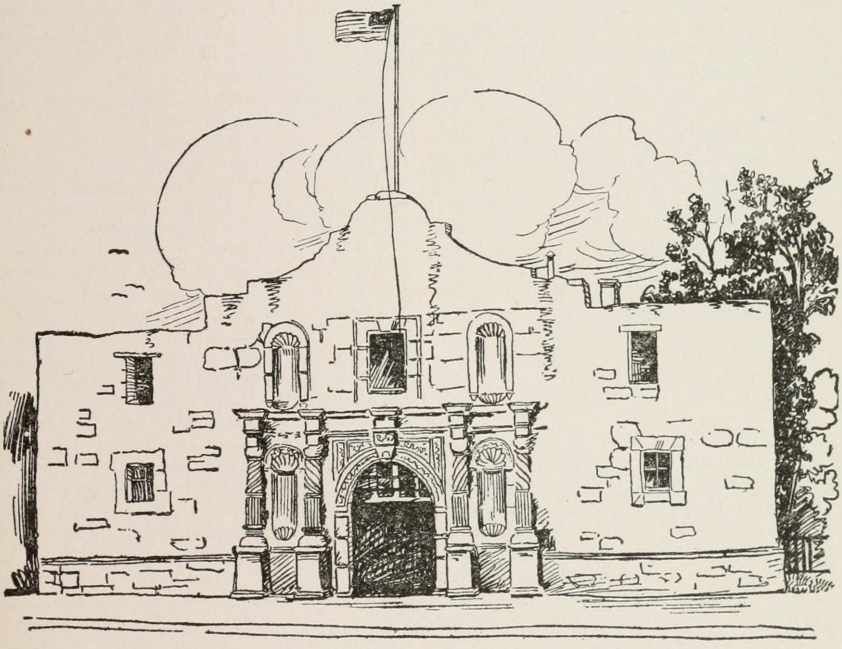


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ALARIA, a genus of sea-weeds belonging to the order *fucaceæ*, or sea-wracks, and the tribe *luminaridæ*. One species, *alaria esculenta*, called by the Scotch balderlocks, is used for food in Ireland, Scotland, Iceland, Denmark, and the Faroë Isles.

ALARIC (al'ar-ik), a celebrated conqueror, King of the Visigoths. He was a commander of the Goths in the service of Rome, and in 395 revolted and invaded Greece, capturing Athens. He was opposed by Stilicho, and retreated to Epirus; was then made prefect of Illyricum by the Emperor Arcadius, and was elected king by his own people. In 400 he invaded the Western Empire, reaching Milan in 403. He besieged the Emperor Honorius in Asto, who was relieved by Stilicho, and a drawn battle was fought at Pollentia; soon afterward he suffered a serious defeat at Verona. He was again appointed prefect of Illyricum. On the death of Stilicho, Honorius repudiated his obligations to Alaric, who immediately marched upon Rome and laid siege to it (408); but was induced to leave by the promise of 5,000 pounds of gold and 30,000 pounds of silver. Enraged by further breach of covenant, he advanced on Rome a third time (410), and his troops pillaged the city for six days, Alaric, who was an Arian Christian, like his people, forbidding his soldiers to dishonor women or destroy religious buildings. When Alaric quitted Rome, it was only to prosecute the conquest of Sicily. In 410 he died at Cosenza, in Calabria.

ALARIC II., eighth King of the Visigoths, ruled, from 484 onward, Gaul S. of the Loire, and most of Spain. An Arian, he was attacked, completely routed near Poitiers, and slain by the orthodox Clovis, King of the Franks (507).



THE ALAMO, SAN ANTONIO, TEXAS.

ALASKA, a Territory in the Western Division of the North American Union, comprising the extreme northwestern part of the American continent; bounded by the Arctic and Pacific Oceans, Bering Sea, British Columbia, and the Northwest Territories of Canada; gross area, as far as determined, 581,107 square miles; purchased from Russia, in 1867, for $7,200,000; given a territorial district government in 1884; administrative districts 4; pop. (1910) 64,356; (1920) 54,718; seat of government, Juneau.

Topography.—The Territory includes Prince of Wales Island, the Alexander or King George Archipelago, and the Kadiak, Aleutian, Pribiloff, and St. Lawrence Islands. The coast line exceeds that of the entire Atlantic seaboard of the United States, and has several notable

indentations, as Prince William's Sound, Cook Inlet, Bristol Bay, and Northern and Kotzebue Sounds. The extreme length of the mainland, from N. to S., is about 1,100 miles; extreme width, 800 miles. Among rivers, the most important are the Yukon, rising in British Columbia, and about 2,000 miles in total length; the Kuskokwim, which empties into Bering Sea; the Colville, Copper, and Sushitna. Here the Rocky Mountains merge into the Alaskan, culminating in Mount Wrangell, 17,500 feet high. Another range, near the coast, reaches its extreme height in Mount Logan, 19,500 feet (according to Harrington), and Mount Fairweather, 15,500 feet.

Geology.—The Arctic District is treeless with ranges of hills; the Yukon Basin has large areas of forests; the Kuskokwim District resembles the Yukon Basin, but has more mountains; the Aleutian comprises treeless islands; the Kadiak is still but little known; and the Sitka has valuable timber lands. The glacial and volcanic periods still survive; beds of cretaceous and miocene lignites, dikes of plutonic rock, hot and boiling springs, quartz-bearing ledges, and aurif_erous gravel beds and sands are abundant.

Mineralogy.—Gold was discovered on the Kenai peninsula in 1848, but was not sought further. In 1880, surface gold was found in the S. E., and systematic mining may be said to have begun then. Lignite coal, native copper, cinnabar, graphite, iron ore, white marble sulphur, medicinal springs, mica, kaolin, manganese, asphalt, and petroleum are found in various sections, and many of them in accessible locations and paying quantities. At present gold mining is the principal mineral industry, and the largest fields are in the Yukon region, on both sides of the boundary line, and in the Cape Nome district, on Bering Sea, and wholly within the American territory, where gold was first discovered in 1898.

The annual production of gold has fallen off greatly in the last decade. It reached in 1909 a maximum of $29,411,-716, falling to $9,480,952 in 1918. This is caused chiefly by the falling off in the discovery of bonanza mines and the neglect of the systematic development of the lower-grade ores. The production of copper has also shown a gradual decrease. The production in 1917 was 88,793,400 pounds, valued at $24,240,598. This fell off in 1918 to 69,224,951 pounds, valued at $17,098,563. The loss was due chiefly to a shortage of labor, and transportation. The production in 1919 was about 44,-800,000 pounds of copper valued at $8,500,000. The coal production continues to be small, due chiefly to a lack of development. In 1918 it amounted to 75,616 tons, valued at $411,815. Other mineral products are lead, tin, platinum, and petroleum. The resources of the latter are indicated to be large and await only development and the building of railway lines.

Fisheries.—Fish are the most valuable of Alaskan products in value. The total investment in fishing industries in 1919 was $73,750,789. There were employed in the industry nearly 35,000 persons. The total value of fishery products was $69,154,859 in 1918. Over 90 per cent. of the fish taken were salmon. Others were herring, halibut, and whales. The herring industry has greatly increased in recent years through the introduction of the Scotch curing method. Salmon canneries in 1918 shipped about 5,500,-000 cases of 48 pounds each.

The number of seals in the waters about Alaska has greatly increased, owing to the restrictions placed upon sealing by laws passed by Congress. The seal herds in 1919 numbered 524,269 seals. The number of seals taken during that year was 25,381. Under the International Convention, 15 per cent. of all seals taken go to Canada and an equal number to Japan.

Agriculture.—The United States Department of Agriculture has for many years made persistent and intelligent efforts to develop agriculture in the territory and these results have met with considerable success. There are large areas of land suitable for the raising of crops, both agricultural and horticultural. The Central Tanana Valley has been extensively occupied by farmers and in the Fairbanks district there are nearly 100 homesteads comprising nearly 25,000 acres. Nearly all varieties of hardy grains can be grown in Alaska and most hardy fruits and vegetables can be grown without difficulty.

Education.—There were in 1919 65 schools for natives in which were enrolled about 3,600 pupils. There was a Federal appropriation of $215,000 for the support of these schools. Schools are also maintained in the different localities for white pupils.

Banking.—In 1919, the Territory had one National bank, with $125,000 in capital, $11,250 in outstanding circulation. Much of the banking is done in Seattle, Wash., and San Francisco, Cal., whither the bulk of the output of gold is sent.

Commerce.—Trade between Alaska and continental United States has greatly increased in recent years. The value of shipments into and from Alaska in 1916 was $97,917,650; in 1917, $121,265,-947; in 1918, $131,767,788; and in

1919, $117,018,135. The loss in the last year was chiefly due to the falling off of mineral production. Trade suffered from insufficient and irregular transportation.

Railroads.—There was under construction in 1919 the so-called United States railroad, authorized in 1914 at a cost of $35,000,000. This sum was increased in 1919 to $52,000,000, of which $6,000,000 was appropriated for work during 1919. The purpose of the project is to furnish transportation between a port on the Gulf of Alaska and the rich mines and lands of the Tanana valley and the Central Yukon valley. The system when completed will include 601 miles of track from Seward on the Kenai Peninsula to Fairbanks, the mining center of the Tanana valley. There will also be branch railroads to other important localities. There was at the end of 1919 in preparation a northern section of 143 miles and a southern section of 206 miles. There are only two railroads in the Territory under private control. These run from Cordova to Kennecott and from Skagway to White Horse.

Government.—Up to 1912 Alaska was an unorganized Territory and had no local legislative body. It was governed directly by Congress, and the officers were appointed by the President. In the year mentioned Congress passed a Civil Government Act which created a Legislature and Assembly with limited powers. By this act Alaska became an organized Territory with a Legislature consisting of a Senate of 8 members, two from each of the four districts, and a House of Representatives, consisting of 16 members, four from each judicial district. Senators serve four years and representatives two years. The Legislature meets every two years. Its first session was held in March, 1913. The legislative powers are limited, and it can pass no laws which are inconsistent with the laws already passed by Congress. At its first session the Legislature modified the qualifications for voters by extending the franchise to women. The governor has the usual power of veto. The executive officers are a governor, appointed by the President, secretary of the treasury, the secretary of the governor, and a surveyor-general. There are four judicial districts, with centers at Juneau, Nome, Valdez, and Fairbanks. Except in towns of 300 or more, which are allowed to incorporate, there is no local government. Alaska is represented in Congress by one delegate.

History.—Alaska was discovered by Bering in 1741, and Russian settlements were made to a considerable distance southward. In 1772 many trading companies were established, and later Captain Cook's accounts of the fur animals there caused many more to be organized. In 1799 the Territory was granted to a Russian company by the Emperor Paul VIII., and in 1867 it passed to the United States by treaty with Russia. For several years there has been a contention between the United States and Great Britain concerning the boundary line between Alaska and the British territory in Canada, which became greatly accented in 1896 in consequence of the remarkable discoveries of gold in the Yukon valley. Both governments have had the disputed region surveyed, separately and by a joint commission, and the delimitation of the boundary was the most important matter referred to the Anglo-American Commission of 1898. In January, 1900, it was believed that a satisfactory settlement had been negotiated by the two governments.

On Jan. 24, 1903, a treaty was signed between the United States and Great Britain, by which was created the Alaska Boundary Tribunal, consisting of three from each country to settle questions in dispute. This tribunal met in London in the following September, and on Oct. 20, 1914, the majority voted against the Canadian contentions. The deciding vote was cast by a representative of Great Britain. By this decision Canada was shut off from the seacoast north of 54° 40′. Surveying was at once begun to determine a new boundary, and continued through the years following. In 1910-1911 there was carried on an acute dispute in regard to the coal lands of Alaska, as a result of charges made that large corporations acting under laws passed by Congress were attempting to secure control of valuable coal land. As a result of this agitation, R. L. Ballinger, Secretary of the Treasury, resigned, and his successor, Walter L. Fisher, undertook a thorough investigation of the matter. The syndicates which had attempted to secure possession of the coal lands finally withdrew. At the outbreak of the World War over 3,000 men enrolled for service, a number far beyond the required quota. Ninety-four per cent. of the white population and 1,303 of the natives were enrolled in the Red Cross. Alaska led all other States in its per capita subscription for War Stamps. In 1918 the Government set apart as a National monument the great volcano of Katmai and the surrounding region, comprising over 1,000,000 acres. This volcano erupted violently in 1912 and had smaller eruptions in following years. The National Georgraphical Society in 1919 carried on explorations in the Kat-

mai regions. Since its creation as an organized Territory, Alaska has steadily advanced in population and industries.

ALBA LONGA, a considerable city of Latium, founded by Ascanius, son of Æneas, in B. C. 1152. It was the birthplace of Romulus, under whose dominion it fell, in consequence of the victory of the Romans in the contest between the Horatii and the Curiatii. It was situated on the opposite side of the Lake Albano from where the new town of Albano stands. There was also a city of Alba near the Lacus Fucinus; an Alba Pompeia in Liguria; and an Alba Julia, now Weissenburg, in Transylvania.

ALBAN, ST., the first Christian martyr in Great Britain, lived in the 3d century. After having served years as a soldier under the Emperor Diocletian, he returned to Britain, embraced Christianity, and suffered martyrdom in the great persecution of Diocletian.

ALBANI, a powerful family of Rome, which has supplied the Roman Catholic Church with several cardinals. Two of them are well known as patrons of the fine arts: (1) ALBANI, ALESSANDRO, born in 1692; died in 1779; he was a great virtuoso, and possessed a collection of drawings and engravings which, at his death, was purchased by George III. for 14,000 crowns. (2) ALBANI, GIOVANNI FRANCESCO, nephew of the former, born 1720; a great friend to the Jesuits, but in other respects liberal and enlightened. His palace was plundered by the French in 1798, when he made his escape to Naples, stripped of all his possessions. Died in 1803.

ALBANI, FRANCESCO, a famous Italian painter, born at Bologna, 1578; was a scholar of Guido. He was fond of representing the fair sex, and his compositions, in love subjects, are held in high esteem. The most celebrated of the productions are: "The Sleeping Venus," "Diana in the Bath," "Danaë Reclining," "Galathea on the Sea," and "Europa on the Bull." He has been called the Anacreon of painters. It is said that his second wife, who was very beautiful, and his children, served as models for his Venuses and Cupids. Died in 1660. His brother and disciple, GIOVANNI BATTISTA, was a distinguished historical and landscape painter. Died in 1668.

ALBANI, MARIE EMMA (LAJEUNESSE), a dramatic soprano and opera singer, born in 1852, at Chambly, near Montreal, Canada. After studying with Lamperti, at Milan, she made her début at Messina (1870), in "La Sonnambula," under the name Albani, in compliment to the city of Albany, where her public career began.

ALBANIA, the name given to a region between the Adriatic Sea, Greece, Macedonia, and Montenegro. Upper or northern Albania formed part of the Illyria of the Romans; lower or southern Albania corresponds to ancient Epirus. It comprises the *vilayets* of Scutari and Janina and parts of Monastir and Kossovo. It formed the southwestern portion of former European Turkey, and extends along the western shore of the Balkan peninsula, from the river Bojana to the Gulf of Arta. There are three lakes, Scutari, Ochrida, and Janina. The principal rivers are the Boyana, Drin, Shkumbi, and Artino. A fine climate and a favorable soil would seem to invite the inhabitants to agriculture, but in the N. little is cultivated but maize, with some rice and barley, in the valleys; the mountain terraces are used as pastures for numerous herds of cattle and sheep. In the S. the slopes of the lower valleys are covered with olives, fruit, and mulberry trees, intermixed with patches of vines and maize, while the densely wooded mountain ridges furnish valuable supplies of timber. The plateau of Janina yields abundance of grain; and in the valleys opening to the S. the finer fruits are produced, along with maize, rice, and wheat. The inhabitants form a peculiar people, the Albanians, called by the Turks Arnauts, and by themselves Skipetar. The Albanians are half-civilized mountaineers, frank to a friend, vindictive to an enemy. They are constantly under arms, and live in perpetual anarchy. At one time the Albanians were all Christians; but after the death of their last chief, the hero Skanderbeg, in 1467, and their subjugation by the Turks, a large part became Mohammedans. Albania became an independent state in 1912. Pop. about 850,000. Durazzo, the capital, 5,000; Scutari, 32,000. Prince Wilhelm of Wied accepted the crown in March, 1914, but fled at the outbreak of the European War and the state fell into anarchy. Essad Pasha Topdani attempted to establish a military government in October, 1914, but failed. Austrian armies overran Albania in 1916 and again in 1917. The Italian general commanding Italian forces proclaimed the independence of the country and a government was set up at Durazzo. The political status of Albania was undetermined in 1920. The people had turned against Italy by whom they thought they had been betrayed in offering Scutari to Jugoslavia and south Albania to Greece.

ALBANO (al-bä'nō), a town of Italy, 18 miles S. S. E. of Rome, on the declivity of the lava-walls which encompass Lake Albano, and opposite the site of Alba Longa. There are numerous remains of ancient buildings, including an aqueduct. A valuable wine is made here. Pop. about 10,000.

The ALBAN LAKE, or LAGO DI CASTELLO, is formed in the basin of an extinct volcano, and has a circumference of 6 miles, with a depth of 530 feet. Its surface is 961 feet above the sea-level. While the Romans were at war with Veii (390 B. C.), this lake rose to an extraordinary height in the heat of summer, and diviners declared that the conquest of Veii depended upon letting off the waters of the lake. Hereupon the Romans opened a tunnel through the lava-walls which still remains and still fulfills its ancient office, is a mile in length, with a height of 7 feet, and a width of 4 feet. On the eastern bank of the lake rises Monte Cavo, the ancient Mount Albanus, 3,000 feet high.

ALBAN'S, ST., a small and ancient borough of England, Hertfordshire, 20 miles N. N. W. of London, by the London and Northwestern railway. It is the ancient Roman Verulamium. The abbey church was built in 796, in honor of St. Alban, by the King Offa. Of this first abbey there remains but a gateway. The present abbey is an object worthy the attention of the antiquarian and the student of architecture. It is built in the form of a cross, running 547 feet from east to west, and having a breadth of 206 feet, at the intersection of the transept. Every style of architecture, from the time of the Romans to that of Henry VII., may be traced in it. Near the town of St. Alban's, two battles were fought between the houses of York and Lancaster. In the first, May 22, 1455, Richard, Duke of York, obtained a victory over Henry VI. In the second, Feb. 2, 1461, Margaret of Anjou defeated the army of the Yorkists, commanded by Warwick.

ALBANY, a city of Alabama, formerly known as New Decatur. It is about 80 miles N. of Birmingham. It is on the Tennessee river and on the Louisville and Nashville railroad. The town has grown rapidly in recent years and is now an important industrial center. There are extensive iron manufactures. It has also manufactories of cottonseed oil, lumber, railroad repair shops, and tanneries. Pop. (1910) 6,119; (1920) 7,652.

ALBANY, a city of Georgia, the county-seat of Dougherty co. It is on the Central of Georgia, the Atlantic Coast Line, the Seaboard Air Line, the Georgia Southwestern and Gulf, the Georgia Northern, and the Albany and Northern railroads. It is also on the Flint river, which is navigable at that point. It is both an agricultural and an industrial community. The chief interests are cotton, cottonseed oil, bricks fertilizers, and lumber. The city has an excellent street system and water supply furnished by artesian wells. There is a public library, Federal building, and a monument to Confederate soldiers. Pop. (1910) 8,190; (1920) 11,555.

ALBANY, the capital of the State of New York and the county-seat of Albany co. It is situated on the west bank of the Hudson river, about 145 miles N. of New York City. It is at the head of the navigation of the Hudson river and is the terminus of the Erie and Champlain barge canals. Six railroads radiate from it to every part of the country. It is the terminus of the Boston and Albany railroad and the division terminus of the main lines of the West Shore, the New York Central, and the Delaware and Hudson railroads. The city has direct steamboat communication by day and night lines with New York and Hudson river points, while the Erie and Champlain canals give water communication with the interior of the State and the west and north. The excellent shipping facilities of the city have made it an important commercial center. It is the second largest express and third largest mail transfer in the United States. Albany is a distributing point for the large oil companies, mail-order houses, machinery companies, and other corporations which do a national business.

Albany is an attractive city both in site and as a result of careful city planning, which, in recent years, has transformed certain portions. There is an extensive park system with parks conveniently located to meet the needs of the various sections of the city. Among these are Washington Park, 90 acres, and Lincoln Park, 78 acres. The city maintains free public baths and other recreational features. The water and sewer systems are of the latest approved design. There are excellent hospitals, including three large general hospitals, and a number of special hospitals.

Albany is well equipped with public school facilities. There were in 1920, 23 grammar school buildings and a high school building costing $1,000,000. There are housed in these buildings over 12,000 people. In addition to the public schools there are many well-equipped private and parochial schools. In the city are

12 libraries, not including the State Library, which contains over 525,000 books. There are 75 churches, some of them of great architectural merit. Among the most notable public buildings are the State Capitol, City Hall, Union Station, State College for Teachers, county court house, the State Hall, State Education Building, and the State Library and State Museum. In addition to these there are many handsome business buildings.

The industries of the city are varied. It has the oldest and largest baling press factory in the world, as well as the largest factory devoted to the manufacture of car-heating apparatus. It has also the largest toy factory in the United States. Other industries are the manufacture of billiard balls, patent stove specialties, writing paper, underwear, locomotives, gas ranges, beds, dies, cart wheels, chemicals, lumber, printing products, shirts, etc.

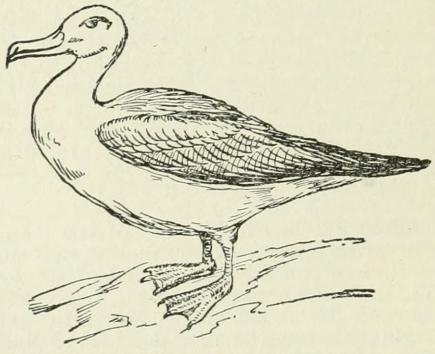
The assessed valuation of real estate of the city is about $100,000,000, with a personal valuation of about $10,000,000. There are four banks of discount, two trust companies, and seven savings banks, in the latter a deposit of nearly $100,000,000.

The first permanent site of Albany was made in 1614 by a company of Dutch traders who established a station at Castle Island under the name of Fort Nassau. The station was removed later to the mainland. In 1623 eighteen Walloon families sent by the Dutch West India Company settled on the present site of the city. In the same year Fort Orange was erected near the site of the present Steamboat Square. The settlement suffered severely from Indian attacks but continued to grow steadily. It received its name in 1664 from the Duke of York and Albany, afterward James II. It obtained a city charter in 1686 and became the capital of the State in 1797. Albany was selected for the convention of the First Provisional Congress which formed "a plan for a proposed union of several colonies." Pop. (1890) 94,923; (1900) 94,154; (1910) 100,253; (1920) 113,344.

ALBANY CONGRESS, an assembly of representatives of the most important British North American colonies, which was called together in 1754 by the British Government to consult in regard to the threatening French war. Two plans were proposed: First, a league with the Indians, which was carried out, and, second, a proposal offered by Franklin for a political union. In this a common president was proposed and a great council, representing the different colonies. This plan was rejected by the British crown because it gave too much power to the colonies, and by the colonies because it gave too much power to the crown. The significance of this congress lies in the fact that it stimulated the union of the colonies which was afterward accomplished.

ALBANY REGENCY, THE, a name given in American political history to a powerful combination of eminent Democratic leaders of New York State. It was instituted in 1822 by Martin Van Buren, who remained its dominating spirit for many years. It continued to exercise large power until 1854, with such men as William L. Marcy, Silas Wright, John A. Dix, and Horatio Seymour identified with it. Afterward Samuel J. Tilden, Dean Richmond, and Daniel Manning preserved in a manner its traditions.

ALBATROSS, a large sea bird, belonging to the *procellaridæ*, or petrol family. It is the diomedea exulans of Linnæus. When young it is of a sooty or brown



ALBATROSS

color, but when mature it is white with black wings. It nests on elevated land, and lays numerous eggs, which are edible. S. of the Cape of Good Hope sailors call it the Cape sheep; sometimes, also, it is named the man-of-war bird. Everything about the great wandering albatross is vast—the wings are enormous, its flight is reckoned by the thousand miles. There is a northern species near Bering Straits.

ALBAY, a province in the S. E. part of Luzon, Philippine Islands, and the richest hemp-growing district on the island. In January, 1900, Brig. Gen. William A. Kobbe, United States Volunteers, was appointed military governor of the province and Catanduanes Island,

with temporary authority over Samar and Leyte Islands, for the purpose of occupying and opening to trade the various hemp ports. He had several sharp fights to gain possession of his new command. Pop. about 250,000.

ALBEMARLE SOUND, an inlet near the N. E. extremity of the State of North Carolina, running inland for 60 miles, with a breadth of from 4 to 15 miles. It has no great depth of water, and a narrow island at its mouth prevents the sound from being affected by the tides. Into its upper extremity the Roanoke and Chowan rivers debouch. It is connected by channels with Chesapeake Bay and Currituck and Pamlico Sounds.

ALBERONI, GIULIO (al-ber-ō'nē), cardinal and minister of the King of Spain, was the son of a gardener. Born in 1664, at Firenzuola, a village of Parma, and educated for the Church, his first office was that of bell-ringer in the Cathedral of Piacenza. Possessed of uncommon talents, he soon became canon, chaplain, and favorite of the Count Roncovieri, and Bishop of St. Donnin. The Duke of Parma sent him as his minister to Madrid, where by cunning and intrigue he became privy councillor, prime minister, and cardinal. He engaged himself with schemes for the benefit of the Spanish nation; but, being undermined by foreign influence, he was deprived of his posts and banished to Rome. Died at Placentia, 1752.

ALBERT I., Duke of Austria, and afterward Emperor of Germany, was son of Rudolph of Hapsburg, who founded the Austrian imperial dynasty. He was crowned in 1298, after defeating and slaying his competitor, Adolphus of Nassau, and was assassinated in 1308 by his nephew John, son of the Duke of Suabia, whose paternal estates he had seized. The story of William Tell is connected with Albert I.

ALBERT II., King of Hungary and Bohemia and Duke of Austria, succeeded Sigismund as Emperor of Germany in 1438. He held a great diet at Nuremberg, in which the Vehmic or secret courts were suppressed. He died the following year, as he was preparing to take the field against the Turks, who were ravaging Hungary.

ALBERT I., King of the Belgians, born April 8, 1875, son of Prince Philippe de Saxe-Coburg and Gotha and of Flanders, who died Nov. 1, 1905. At the death of his uncle, Leopold II., Dec. 17, 1909, Albert ascended the throne. His character has proved to be in complete antithesis to that of his predecessor, whose profligate and shameless life had been the scandal of Europe. His family and public life has been without reproach, and his winning qualities have



ALBERT I., KING OF THE BELGIANS

won him the esteem and affection of his people. On Oct. 2, 1900, he married Princess Elizabeth of Bavaria. He has three children, of whom Prince Leopold, born Nov. 3, 1901, is the heir to the throne. The reign of Albert prior to the outbreak of the World War in 1914 was one of marked progress and prosperity. The Socialist party was strong in Belgium, and labor troubles were frequent and at times serious, but the tact of the king was successful in composing them. When the war broke out, the king placed himself at the head of his army, and throughout the conflict shared the hardships of his men. When the overwhelming forces of the Germans had taken possession of the little kingdom, the government was removed to Havre, France. In the four years of conflict that ensued the king exhibited military qualities of a high order, and played a prominent part in the 1918 operations that compelled the Germans to evacuate his kingdom. After the armistice was signed he made a triumphal entry into Ghent, Brussels, and other cities of Belgium, and was received with the wildest rejoicings. In 1919 he visited the United States with his wife and the heir apparent, and everywhere was met with enthusiastic welcome. See WORLD WAR; BELGIUM.

ALBERT, MARGRAVE OF BRANDENBURG, and first Duke of Prussia, was born in 1490. He was elected, in 1511, Grand Master of the Teutonic Order, which held dominion over Prussia proper, that part of the former Kingdom of Prussia which borders on the Baltic Sea. He fought against Sigismund, King of Poland, for the defense of his order, which had been for ages at war with the Poles. Peace was made in 1525, at Cracow, in which Albert managed to have the Duchy of Prussia secured to himself and his descendants as a fief of the crown of Poland, thus laying aside the rights of the order. Albert, some time after, embraced the Protestant faith, and married a princess of Denmark. One of his descendants, Frederick William, Elector of Brandenburg, threw off the allegiance of Poland, and his son, Frederick I., changed the title of duke into that of King of Prussia in 1701.

ALBERT, PRINCE CONSORT, was born at Schloss Rosenau, near Coburg, Aug. 26, 1819, the younger son of the Duke of Saxe-Coburg-Gotha, by his first marriage with Louisa, daughter of the Duke of Saxe-Gotha-Altenburg. After a careful domestic education, the prince, along with his elder brother, studied at Brussels and Bonn (1836-1838). This prince the young Queen of Great Britain selected as her partner for life. They met first in 1836, and the marriage was celebrated in London on Feb. 10, 1840, when Prince Albert received the title of Royal Highness, was naturalized as a subject of Great Britain, and obtained the rank of field-marshal. The title of Consort of Her Most Gracious Majesty was formally conferred in 1842, and that of Prince Consort in 1857. Notwithstanding his high and favored position, he abstained from undue meddling with state affairs, and thus escaped the jealousy and detraction of parties. He devoted himself to the encouragement and promotion of science and art, appearing as the patron of many useful associations and public undertakings. The Exhibition of 1851 owed much to his strong interest. As regards Continental politics, his ruling idea was that Prussia should be supreme in Germany. He died of typhoid fever at Windsor Castle, Dec. 14, 1861.

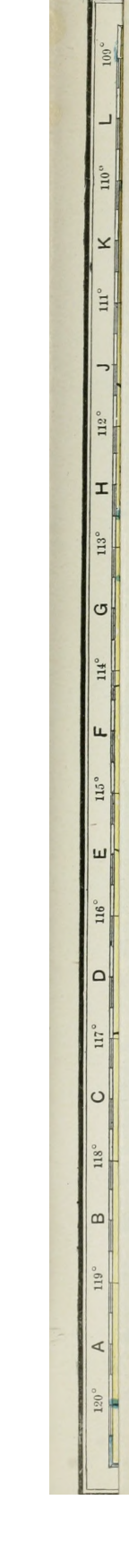
ALBERT, PRINCE OF MECKLENBURG, was called to the throne of Sweden, 1364, by the nobility, who had deposed King Magnus. The Swedes being dissatisfied with Albert, who favored his German countrymen at their expense, offered the crown to Margaret, Queen of Denmark and Norway. After several years of war, Albert lost the decisive battle of Falköping, 1388, and was made a prisoner. Peace, however, was not re-established in Sweden till 1395, when Albert consented to give up his claims to the crown. He then retired to Mecklenburg, where he died.

ALBERT EDWARD NYANZA (Muta-Nzige, southern Luto Nzige), a lake of equatorial Africa, discovered by Stanley in 1876, and again visited by him in 1889. It occupies the southern end of a vast natural depression, of which the Albert Nyanza fills the northern extremity. It is 3,242 feet above sea-level; and beyond the depression in which it lies is a table land from 5,500 to 6,500 feet high. The water of the lake flows into the Albert Nyanza by the Semliki river.

ALBERT LEA, a city of Minnesota, the county-seat of Freeborn co., about 100 miles S. of Minneapolis. It is on the Chicago, Milwaukee and St. Paul, the Minneapolis and St. Louis, and Chicago, Rock Island and Pacific, the Iowa Central, and the Illinois Central railroads. Its fine natural surroundings make it a popular summer resort. It has two lakes, parks, and boulevards. In the city are a handsome court house, Albert Lea College for Women, and Luther Academy. It is the center of an extensive agricultural and dairying region. Its industries include gas-engine works and a paper-box factory, tank factories, creameries, packing houses. Pop. (1910) 6,112; (1920) 8,056.

ALBERTA, a Province of northwest Canada, east of British Columbia and west of Saskatchewan. It has an area of 253,540 square miles. Pop. about 500,000. The chief cities are Calgary, (pop. about 5,700), and Edmonton (pop. about 5,400). The latter is the capital. The constitution under which the Province is governed was established in 1905. The executive power is nominally in the hands of the Lieutenant-Governor, but actually is carried on by the Executive Council or Cabinet of the Legislature. The legislative power is vested in the assembly elected by universal suffrage. Women have the right to vote.

Alberta is of great importance agriculturally. The production of fall wheat in 1919 was about 616,000 bushels; of spring wheat, about 26,000,000 bushels; oats, about 27,000,000 bushels; barley, about 10,000,000; rye, about 1,300,000. Dairy products in 1918 were valued at $27,500,000. There were in the same year 1,317 manufacturing establishments with a capital of $63,215,444, and the value of products, $71,669,423. The live stock


120°
A
119°
B
118°
C
117°
D
116°
E
115°
F
114°
G
113°
H
112°
J
111°
K
110°
L
109°


ALBERTA
SCALE OF MILES
0 10 20 30 40 50
EDMONTON
CALGARY
VICTORIA TRAIL
EDMONTON TRAIL
CALGARY TRAIL
MACLEOD
MEDICINE HAT
RED DEER
STRATHCONA
Peace River Landing
Dunvegan
Grouard
High Prairie
Slave Lake
Sawridge
Martin Mt.
House Mt.
Wallace Mt.
Goose L.
Whitefish Lake
Little Whitefish L.
Round L.
Hosagami Lake
Pelican L.
Pelican Mt.
Waiau L.
Waiau R.
Waiau Mt.
Waiau Lake
Waiau Creek
Waiau Valley
Waiau Pass
Waiau Peak
Waiau Ridge
Waiau Range
Waiau Basin
Waiau Plateau
Waiau Mountains
Waiau Hills
Waiau Valley
Waiau Creek
Waiau River
Waiau Lake

industry is important. The total live stock numbered 3,417,141, including about 330,000 cows, and 735,000 other cattle. Swine numbered about 600,000 and sheep about 330,000. There were valuable mineral deposits. There were mined in 1918 nearly 3,000,000 tons of coal. There are also rich natural gas deposits. The railway mileage in 1918 was 4,444. The trade imports in 1918-1919 were valued at $15,926,379, and the exports at $2,256,186.

ALBERTSON, CHARLES CARROLL, an American clergyman; born in Plainfield, Ind., in 1865. He studied law and afterward theology at the Garrett Biblical Institute and the Northwestern University, and then served as pastor in several cities in New York and Pennsylvania. From 1899 to 1904 he was pastor in Philadelphia and from 1904 to 1913 he was pastor of the Central Presbyterian Church of Rochester, N. Y. In 1913 he became pastor of the Lafayette Avenue Presbyterian Church of Brooklyn. He was the founder and president of the Book Lovers' Guild and lecturer for the American Philosophical Society. He edited several works and was the author of many books, sermons, and essays including "Death and Afterwards" (1907); "College Sermons" (1912); "Distinctive Ideas of Jesus" (1915).

ALBERTUS MAGNUS, "Albert the Great," Count von Bollstädt, a German scholastic philosopher; born at Lauingen, Suabia, 1193. He became Bishop of Ratisbon in 1260. One of the greatest scholars of his age, he taught philosophy and theology at Cologne and Paris. So great was his knowledge that he was accounted a magician by his contemporaries. His works, treating chiefly of physical science, fill 21 volumes. They appeared in 1651. He died at Cologne, Nov. 15, 1280.

ALBI, or **ALBY,** the capital of the department of Tarn, France; the ancient Albiga; a stronghold of the Albigenses, to whom it gave their name. The Cathedral of St. Cecilia is chiefly of the 14th century, with Italian frescoes dating from about 1505. Pop. about 25,000.

ALBIA, a city of Iowa, the county-seat of Monroe co., about 70 miles S. E. of Des Moines. It is on the Chicago, Burlington and Quincy, the Minneapolis and St. Louis, the Wabash, and the Southern Iowa Traction Company railroads. The city has a large coal industry and is the center of an extensive coal mining community. There are also important agricultural industries. The city has metal works, a packing house, a telephone factory. Pop. (1910) 4,969; (1920) 5,067.

ALBIGENSES (al-bē-zhans' or al-bē-jen'sēz), the name commonly given to a Christian sect, or to several sects, which arose in the south of France; suppressed early in the 13th century on account of alleged heresies. Their name may have been derived from the town of Albiga or Albi, where their doctrines had many followers. In their belief were included some of the Manichæan tenets, such as the repudiation of the Old Testament and the dualistic philosophy of the evil of matter and the emanation of spirit. The growth of the sect and the spread of their heresies brought them in conflict with the Catholic authorities, who waged against them a policy of extermination. They were condemned at various councils, and in 1198 Innocent III. endeavored to extirpate them by sending several legates to Toulouse as inquisitors. He excommunicated Count Raymond of Toulouse (1207), who consistently protected the Albigenses. The murder of the Legate Peter of Castelnau, in 1209, gave the Pope occasion for employing severer means. He proclaimed a crusade for the abolition of the sect. The war against the Albigenses was waged zealously, and many were sacrificed who had no connection with them. After a peace concluded in 1229 between Raymond VII. and the Pope, they were left without protection, and the Inquisition completed their destruction.

ALBINO, a human being or animal abnormally white, with pinkish eyes. The phenomenon must have struck most people in the case of white mice and white rabbits. A human albino has the skin preternaturally fair. The hairs on the head and body are white, the eyes a pinkish appearance; moreover they are painful when exposed to light of even the ordinary intensity.

ALBION, the oldest name by which the island of Great Britain was known to the Greeks and Romans. Great Britain and Ireland were known by the general appellation of the Britannic Islands, while the former was designated by the particular name of Albion or Alwion, and the latter by that of Ierne, Iouernia, or Erin. Cæsar does not use the word Albion; his name for England is Britannia. The name of Albion was probably given to England by the Gaels of the opposite coast, who could not fail to be struck with the chalky cliffs that characterize the nearest part of Kent.

ALBION, a city of Michigan in Calhoun co. It is on the Michigan Central, the Lake Shore and Michigan Southern railroads, and an electric line running from Kalamazoo to Detroit. It is also on the Kalamazoo river. The city has important manufactures of iron, automobile springs, and other accessories, and agricultural implements; a library, two hospitals, a park, and is the seat of Albion College. Pop. (1910) 5,833; (1920) 8,354.

ALBION, a village of New York, the county-seat of Orleans co. It is on the New York Central, the Buffalo, Lockport and Rochester railroads and the Erie canal. It has a library, high school, court house, memorial church, and several public institutions. Its industries include a canning factory, cement works, etc. Pop. (1910) 5,016; (1920) 4,683.

ALBION COLLEGE, a coeducational institution in Albion, Mich., organized under the auspices of the Methodist Episcopal Church; reported in 1919: Professors and instructors, 24; students, 560; president, Samuel Dickie, LL. D.

ALBOIN, a king of Lombardy, who, after having slain Cunimund, King of the Gepidæ, married his daughter Rosamond. He was slain in 574, by an assassin instigated by his wife.

ALBOLENE, a hydrocarbon oil used in medicine to carry remedies to be sprayed into the nose and deeper air passages. It is also used for dressing wounds. It is a petroleum product.

ALBRIGHT COLLEGE, a coeducational institution for higher learning under the control of the Knight Evangelic Church at Myerstown, Pa. There were in 1919-1920, 232 students and 20 instructors. The library contains about 10,000 volumes. The property is valued at about $150,000, and the income about $30,000 annually. President, Rev. L. C. Hunt, A. D.

ALBUERA (al-bo-ā'rä), a village of Spain, in the province of Badajoz, on the Albuera river; 13 miles S. E. of Badajoz. Here (May 16, 1811) a British and Portuguese army of 32,500, under General Beresford, defeated in a sanguinary battle a French army of 23,000 under Marshal Soult, the total loss being 16,000, about equally divided. Soult tried to relieve Badajoz, which was besieged by the British, but was obliged to withdraw to Seville, while the allied British and Portuguese, of whom Wellington then took command, continued the siege.

ALBUMEN or **ALBUMIN**. (1) In chemistry, the name of a class of albuminoids that are soluble in water, as serum and egg albumen. Egg albumen differs from serum by giving a precipitate when agitated with ether; it is scarcely soluble in strong nitric acid; its specific relation is 35.50 for yellow light. The white of eggs is composed of this substance; it dries up into a light yellow gum-like substance, which will not putrefy. It is an antidote in cases of poisoning by corrosive sublimate or copper salts.

Derived albumens are insoluble in water, and in solutions of NaCl (sodium chloride), but soluble in dilute acids and alkalies. There are acid albumens and alkali albumens.

Acid albumen is formed by adding a small quantity of dilute HCl (hydrochloric acid) to serum or egg albumen, and gradually raising the temperature to 70°.

Alkali albumen, or albumenate, is obtained by adding very dilute caustic alkali, heating the liquid, and precipitating with acids. It closely resembles the casein of milk. Potassium albuminate is also called protein.

(2) In botany, a substance interposed between the embryo and the testa of many plants. It varies greatly in amount, being particularly large in some endogens, such as the cocoanut, in which it constitutes the eatable part of the fruit.

(3) In photography, a process by which albumen is used instead of collodion to coat glass or paper.

ALBUMINOIDS, in chemistry, a name given to certain chemical substances which occur in the animal and vegetable tissues. They are amorphous, and their chemical constitution has not yet been discovered.

ALBUQUERQUE (al'be-kerk), a town and country-seat of Bernalillo co., N. M.; on the Rio Grande and the Atchison, Topeka and Santa Fé and the Santa Fé Pacific railroads; 75 miles S. W. of Santa Fé. It has an elevation of 5,000 feet above sea-level; is an ancient and interesting settlement, divided into the Old and New towns; and is the seat of the University of New Mexico and of a Government school for Indians. The town has extensive railroad shops, a foundry and machine works, a National bank, and large mining, trading, and jobbing interests. Pop. (1910) 11,020; (1920) 15,157.

ALBUQUERQUE, AFFONSO D' (al'-bö-kārk'e), "the Great," Viceroy of the Indies, was born in 1453, near Lisbon. In that age, the Portuguese people were distinguished for heroism and a spirit

of adventure. They had discovered and subjugated a great part of the western coast of Africa, and were beginning to extend their dominion over the seas and the people of India. Albuquerque was appointed Viceroy of Portugal's new possessions in the east and landed at Malabar with troops in 1503. Conquered Goa, and later Ceylon, the Sunda Isles, Malaccas, and the island of Ormuz. He made the Portuguese name profoundly respected among the princes and people of the East; and many of them, especially the Kings of Siam and Pegu, sought his alliance and protection. He maintained strict military discipline, was active, far-seeing, wise, humane, and equitable, respected and feared by his neighbors while beloved by his subjects. Yet he did not escape the envy of courtiers and the suspicions of his king, who appointed Soarez, a personal enemy of Albuquerque, to supersede him as Viceroy. This news reached him just as he was leaving Ormuz, and gave a severe shock to his shattered health. A few days after, he died at sea near Goa, Dec. 16, 1515.

ALCÆUS (al-kī'us or al-sē'us), a Greek lyric poet; native of Mitylene; flourished in the 6th century B. C. Of his poems we have only fragments; some were hymns to the gods, others battle songs, still others were in praise of liberty; very many were love songs of pronounced erotic character.

ALCALA DE HENARES (al-ka-lä' de ā-när-ās), a town in Spain, Cervantes' birthplace, on the Henares, 21 miles E. of Madrid by rail. It once boasted of a university, founded by the famous Cardinal Ximenes in 1510. Here was printed in 1517 the great Complutensian Bible. The chief buildings are the Colegio de San Ildefonso, the archbishop's palace, the cathedral, and the Church of Santa Maria, in which Cervantes was baptized, Oct. 9, 1547. The house in which he was born is marked by an inscription. The Complutum of the Romans, the town owes its modern name to the Moors. Pop. about 12,000.

ALCANTARA, a former suburb of Lisbon, noted for the signal victory gained there by the Duke of Alva over the Portuguese in 1580.

ALCANTARA, a fortified town of Spain, capital of a district of the same name, province of Estremadura, the Nova Cæsarea of the Romans. The famous bridge of Trajan, built A. D. 105, exists to-day practically as the Romans left it.

Order of Alcantara.—At the expulsion of the Moors in 1213, which was aided by the Knights of San Julian del Pereyro, the defense of the town was intrusted to them, and they thenceforward assumed the title of Knights of Alcantara. In 1492, Ferdinand the Catholic united the office of grand master with the crown. The Order has been since abolished.

ALCAZAR (äl-kä'thär), the name of many castles and palaces in Spain. Ciudad-Rodrigo, Cordova, Segovia, Toledo, and Seville have alcazars. The one at Seville is an imposing relic of the Arab dominion. The Alcazar of Segovia suffered from a fire in 1862.

ALCEDO, the typical genus of the family *alcedinidæ*, or kingfishers. Two species occur in the United States, the *alcedo ispida*, and the *alcedo alcyon*.

ALCESTE, or **ALCESTIS**, was the daughter of Peleus, and wife of Admetus, King of Thessaly. Her husband, according to an oracle, would die, unless some one made a vow to meet death in his stead. This was secretly done by Alceste, who became sick, and Admetus recovered. After her decease, Hercules visited Admetus, and promised to bring her from the infernal regions. He made Pluto restore Alceste to her husband. Euripides has made this the subject of a tragedy.

ALCHEMY, a study of nature with three special objects: (1) That of obtaining an alkahest or universal solvent. (2) That of acquiring the ability to transmute all metals into gold or silver, especially the former. (3) That of obtaining an elixir vitæ, or universal medicine, which might cure all diseases and indefinitely prolong human life.

The word is derived from the Arabic *alkimia*, compounded of the Arabic article and a Greek word *chemia*, used in Diocletian's decree against Egyptian works treating of the *chemia* (transmutation) of gold and silver.

Tradition points to Egypt as the birth place of the science. Hermes Trismegistus is represented as the father of it; but it should be remembered that the speculations of some of the early Greek philosophers, as of Empedocles, who first named the four elements, pointed in the direction of a rudimentary chemical theory. Zosimus the Theban discovered in sulphuric acid a solvent of the metals, and liberated oxygen from the red oxide of mercury. The students of the "sacred art" at Alexandria believed in the transmutation of the four elements. The Roman Emperor Caligula is said to have instituted experiments for producing gold out of orpiment (sulphuret of arsenic); and in the time of Diocletian the passion for this pursuit, conjoined with magical arts, had become so prevalent in the em-

pire that that emperor is said to have ordered all Egyptian works treating of the chemistry of gold and silver to be burned. For at that time multitudes of books on this art appeared, written by Alexandrian monks and by hermits, but bearing famous names of antiquity such as Democritus, Pythagoras, and Hermes.

At a later period, the Arabs, who had enthusiastically adopted Aristotle from the Greeks, appropiated the astrology and alchemy of the Persians and the Jews of Mesopotamia and Arabia; and to them European alchemy is directly traceable. The school of polypharmacy, as it has been called, flourished in Arabia during the caliphates of the Abbassides. They worked with gold and mercury, arsenic and sulphur, salts and acids; and had, in short, become familiar with a large range of what are now called chemicals. Gebir discovered corrosive sublimate, the process of cupellation of gold and silver, and distillation. To the Arab alchemists we owe the terms alcohol, alkali, borax, elixir.

From the Arabs, alchemy found its way through Spain into Europe generally, and speedily became entangled with the fantastic subtleties of the scholastic philosophy. In the Middle Ages, the monks occupied themselves with alchemy. Pope John XXII. took great delight in it, but denounced the searchers for gold "who promise more than they can perform, and the art was afterward forbidden by his successor. The earliest authentic works on European alchemy now extant are those of Roger Bacon (1214-1294) and Albertus Magnus (1193-1280). Roger Bacon, who was acquainted with gunpowder, condemns magic necromancy, charms, and all such things, but believes in the convertibility of the inferor metals into gold. Still, he does not profess to have ever effected the conversion. Albertus Magnus had a great mastery of the practical chemistry of his times; he was acquainted with alum, caustic alkali, and the purification of the royal metals by means of lead. In addition to the sulphur-and-mercury theory of the metals, drawn from Gebir, he regarded the element water as still nearer the soul of nature than either of these bodies. He is the first to speak of the affinity of bodies, a term he uses in reference to the action of sulphur on metals. Thomas Aquinas also wrote on alchemy, and was the first to employ the word amalgam. Raymond Lully is another great name in the annals of alchemy. He was the first to introduce the use of chemical symbols, his system consisting of a scheme of arbitrary hieroglyphics. He wrote more than 500 works on alchemy.

Basil Valentine introduced antimony into medical use. He, along with some previous alchemists, regarded salt, sulphur, and mercury as the three bodies contained in the metals. His practical knowledge was great; he knew how to precipitate iron from solution by potash, and was acquainted with many similar processes, so that he is ranked as the founder of analytical chemistry.

But more famous than all was Paracelsus, in whom alchemy proper may be said to have culminated. He held, with Basil Valentine, that the elements of compound bodies were salt, sulphur and mercury—representing respectively earth, air, and water, fire being already regarded as an imponderable—but these substances were in his system purely representative. All kinds of matter were reducible under one or other of these typical forms; everything was either a salt, a sulphur, or a mercury, or, like the metals, it was a mixed or compound. There was one element, however, common to the four; a fifth essence or quintessence of creation; an unknown and only true element, of which the four generic principles were nothing but derivative forms or embodiments: in other words, he inculcated the dogma that there is only one real elementary matter, nobody knows what. This one prime element of things he appears to have considered to be the universal solvent of which the alchemists were in quest, and to express which he introduced the term alkahest.

After Paracelsus, the alchemists of Europe became divided into two classes. The one class was composed of men of diligence and sense, who devoted themselves to the discovery of new compounds and reactions. The other class took up the visionary, fantastical side of the older alchemy, and carried it to a degree of extravagance before unknown. Instead of useful work, they compiled mystical trash into books, and fathered them on Hermes, Aristotle, Albertus Magnus, Paracelsus, and other really great men. These visionaries formed themselves into Rosicrucian societies and other secret associations.

ALCIBIADES, son of Clinias and Deinomache, was born in Athens about 450 B. C. He lost his father in the battle of Coronea (447), so was brought up in the house of his kinsman Pericles. His friend Socrates was unable to restrain his love of luxury and dissipation, which found ample means of gratification in the wealth that accrued to him by his union with Hipparete. He first bore arms in the expedition against Po-

tidæa (432), where his life was saved by Socrates—a debt which eight years later he repaid at Delium, by saving, in his turn, the life of the philosopher. He seems to have taken no part in political matters till after the death of



ALCIBIADES

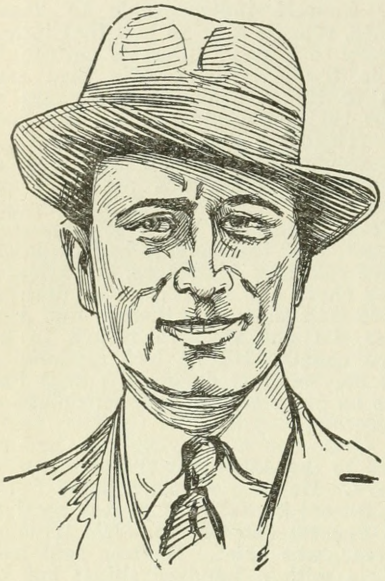
the demagogue Cleon, when Nicias brought about a 50 years' treaty of peace between Athens and Lacedæmon. Alcibiades, jealous of the esteem in which Nicias was held, persuaded the Athenians to ally themselves with the people of Argos, Elis, and Mantinea (420). It was at his suggestion that, in 415, they engaged in the Sicilian expedition, which he commanded, along with Nicias and Lamachus. But while preparations were making, one night all the statues of Hermes in Athens were mutilated. Alcibiades' enemies threw on him the blame of the sacrilege, but postponed the impeachment until he had set sail, when they stirred up the people against him to such a degree that he was recalled in order to stand his trial. On the voyage home, he landed in Italy, and thence crossed to Lacedæmon, where he soon became a favorite. He induced the Lacedæmonians to send assistance to Syracuse, to form an alliance with Persia, and to support the people of Chios in their effort to throw off the Athenian yoke. He went thither himself, and raised all Ionia in revolt. But Agis, and other leading Spartans, jealous of Alcibiades' success, ordered their generals in Asia to have him assassinated. Discovering the plot, he fled to Tissaphernes, a Persian satrap, who had orders to act in concert with the Spartans. He now resumed his old manners, adopted the luxurious habit of Asia, and made himself indispensable to Tissaphernes, representing to him that it was contrary to Persia's interests entirely to disable the Athenians. He then sent word to the Athenian commanders at Samos that he would procure for them the friendship of the satrap if they would establish an oligarchy at Athens. The offer was accepted, and the supreme power vested in a council of four hundred. When it appeared, however, that this council had no intention of recalling Alcibiades, the army of Samos chose him for a general, desiring him to lead them to Athens. But Alcibiades did not wish to return to his native country till he had rendered it some service; and during the next four years he defeated the Lacedæmonians at Cynossema, Abydos, and Cyzicus; recovered Chalcedon and Byzantium, and restored to the Athenians the dominion of the sea. He then returned home (407), on a formal invitation, and was received with general enthusiasm. His triumph, however, was brief. He was sent back to Asia with a hundred ships; but his own ill-success against Andros, and the defeat of his lieutenant at Notium, enabled his enemies to get him superseded (406). He went into exile in the Thracian Chersonesus, and two years later crossed over to Phrygia, with the intention of repairing to the court of Artaxerxes. One night, in 404, his house was fired by a band of armed men; and, rushing out sword in hand, he fell pierced with a shower of arrows.

ALCIDÆ, or **ALCADÆ**, a family of birds (natatores), including auks, penguins, puffins, and guillemots. They are oceanic, and have the bill compressed and pointed. Their wings are adapted for an aquatic life.

ALCMAN, one of the earliest and greatest of Greek lyric poets, belonging to the 7th century B. C. He is supposed to have been a native of Lydia, and to have been taken as a slave to Sparta. Only small fragments of his odes remain. He used the broad, homely Doric dialect. His poems were love ditties, hymns, pæans, processional chants, etc.

ALCOCK, SIR JOHN, British aviator, born in Manchester, England, in 1892. He is famous as having been the first air pilot to make a transatlantic crossing in a non-stop continuous flight. With

one companion, Lieutenant Arthur W. Brown, he left St. Johns, Newfoundland, at 1.43 a. m., June 14, 1919, in a Vickers-Vimy biplane and reached Clifden, Ireland, the following morning, 16



CAPTAIN SIR JOHN ALCOCK

hours and 12 minutes from the time he started. The distance traveled was 1,960 miles. The journey was a terrible one through fog and snow and ice, the latter having at times to be chipped off the machine. For hours they saw neither moon nor stars. Their machine landed in a bog, nose down, but the aviators, though shaken up, were not injured. They received from the London "Daily Mail" the prize of $50,000 that had been offered for the first who should make the flight and later were knighted by the king. Alcock was killed by his airplane crashing to earth while flying over Normandy, France, Dec. 20, 1919.

ALCOHOL, a colorless, inflammable liquid, of agreeable odor, and burning taste, termed also spirit of wine, and ethylic or vinic alcohol.

In organic chemistry, alcohol is the name given to a class of compounds differing from hydrocarbons in the substitution of one or more hydrogen atoms by the monatomic radical hydroxyl (OH)'. Alcohols are divided into monatomic, diatomic, triatomic, etc., according as they contain 1, 2, or 3 atoms of H (hydrogen), each replaced by (OH)'. Alcohols may also be regarded as water in which one atom of H is replaced by a hydrocarbon radical. Alcohol can unite with certain salts, as alcohol of crystallization.

Alcohol is said to be primary, secondary, or tertiary, according as the carbon atom which is in combination with hydroxyl (OH) is likewise directly combined with one, two, or three carbon atoms. The hydrocarbon radicals can also have their carbon atoms linked together in different ways, forming isomeric alcohols. Primary alcohols, by the action of oxidizing agents, yield aldehydes, then acids; secondary alcohols, by oxidation, yield ketones; tertiary alcohols, by oxidation, yield a mixture of acids. Alcohols derived from benzol, or its substitution compounds, are called aromatic alcohols; they contain one or more benzol rings.

In chemistry, pure ethyl alcohol, also called absolute alcohol, is obtained by distilling the strongest rectified spirit of wine with half its weight of quicklime. Alcohol is used as a solvent for alkaloids, resins, essential oils, several salts, etc. Alcohol is obtained by the fermentation of sugars, when a solution of them is mixed with yeast, *Mycoderma cervisiæ*, and kept at a temperature between 25° and 30°, till it ceases to give off CO_2 (carbonic acid gas). It is then distilled. Proof spirit contains 49.5 per cent. of alcohol, and has a specific gravity of 0.9198 at 20° C. Methylated spirit contains 10 per cent. of wood spirit in alcohol of specific gravity 0.830; it is duty free, and can be used instead of spirits of wine for making chloroform, olefiant gas, varnishes, extracting alkaloids, and for preserving anatomical preparations, etc. Wines contain alcohol; port and sherry, 19 to 25 per cent.; claret and hock and strong ale, about 10 per cent.; brandy, whisky, gin, etc., about 40 to 50 per cent.

ALCOHOLISM, a morbid condition resulting from the excessive and persistent use of alcoholic beverages. It has been recognized in recent years as a disease and has been so treated.

ALCOTT, AMOS BRONSON, an American philosophical writer and educator, one of the founders of the transcendental school of philosophy in New England; born at Wolcott, Conn., Nov. 29, 1799. From 1834-1837 his private school in Boston, conducted on the plan of adapting the instruction to the individuality of each pupil, attracted attention. He was on terms of friendship with Emerson, Hawthorne, Channing, Thoreau, Margaret Fuller. After 1840 he lived in Concord, Mass., and was the projector and dean of the Concord School of Philosophy. Lectures on speculative

and practical subjects occupied his later years. His chief works are "Orphic Sayings," contributed to the "Dial" (1840); "Tablets" (1868); "Concord Days" (1872); "Table-Talk" (1877); "Sonnets and Canzonets" (1882); "Ralph Waldo Emerson, His Character and Genius" (1882); "New Connecticut" (1886). He died in Boston, March 4, 1888.

ALCOTT, LOUISA MAY, an American author, daughter of the preceding, born in Germantown, Pa., Nov. 29, 1832; wrote at an early age, "Little Women" (1868), "Little Men" (1871), "Old-Fashioned Girl," "Aunt Jo's Scrap-Bag," "Rose in Bloom," and many others of like character and popularity. She died in Boston, Mass., March 6, 1888.

ALCUIN (alk'win), an English ecclesiastic, born at York in 735. He was a pupil of Bede and of Egbert, whose librarian he became, and who appointed him director of the school of York. His reputation reached Charlemagne, who called him to France in 782 to aid in his designs for education in the empire. Charlemagne became himself a pupil of Alcuin. Alcuin's teaching was in the seven liberal arts of that time, which include music and astronomy; and to these were added Biblical exegesis. Under his influence schools were established at Lyons, Orleans, and Tours. He was so much trusted as to be made a member of the Council of Frankfort (794), where Felix, Bishop of Urgel, was condemned for heresy. Charlemagne loaded Alcuin with riches, and allowed him to have more than 1,000 slaves. He made with his own hand a copy of the Scripture, which he presented to Charlemagne, and which became of great assistance to later editors. His importance lies not so much in his erudition as in the fact that he transplanted the wisdom of antiquity into the kingdom of Charlemagne, and thus into the greater part of Europe. Till his death here in 804, he still corresponded constantly with Charlemagne. His works comprise poems, works on grammar, rhetoric, and dialectics, theological and ethical treatises, lives of several saints, and over 200 letters.

ALCYONIUM, in zoölogy, a genus of polyps; the typical one of the family *alcyonidæ*. The alcyonium digitatum is found attached to stones, mussel shells, as "dead men's fingers," "dead men's toes," and "cow's paps." These names are applied to the alcyonium from its resemblance to finger-shaped masses, each of which masses consists of a colony of several hundred polyps united to form a composite organism. They are found attached to stones, mussel shells, and other objects. The alcyonium carneum abounds on the shores of America N. of the latitude of Cape Cod.

ALDEHYDES, in chemistry, compounds formed by the oxidation of alcohols, and are reconverted into alcohols by the action of nascent hydrogen; by further oxidation they are converted into acids. They differ from alcohols in having two atoms less of hydrogen, which are removed from the carbon atom containing the radical HO′ (hydroxyl) connected to it in the alcohol; thus the aldehyde monatomic radical is (O=C—H)′. Many aldehydes of monatomic alcohols have been prepared by oxidation of the alcohols, or by distilling a mixture of the potassium salt of the corresponding acid with potassium formate, which yields potassium carbonate and the aldehyde. Aldehydes form crystalline compounds with acid sulphites; they also unite with aniline. Ketones are aldehydes in which the atom of hydrogen united to the radical (CO)″ is replaced by a hydrocarbon radical.

ALDEN, HENRY MILLS, an American editor and prose writer, born at Mount Tabor, Vt., Nov. 11, 1836. He was graduated at Williams College and Andover Theological Seminary; settled in New York in 1861, became managing editor of "Harper's Weekly" in 1864, and editor of "Harper's Monthly Magazine" in 1868. He published "The Ancient Lady of Sorrow," a poem (1872); "God in His World" (1890); and "A Study of Death" (1895). He died in 1919.

ALDEN, JOHN, a magistrate of the Plymouth colony, born in 1599. His name is familiarized by the poem of Longfellow, "The Courtship of Miles Standish." He was originally a cooper of Southampton, was employed in making repairs on the ship "Mayflower," and came over in her with the Pilgrim Fathers. He was for over 50 years a colonial magistrate. He died in 1687.

ALDEN, WILLIAM LIVINGSTON, an American humorous writer and journalist, born at Williamstown, Mass., Oct. 9, 1837. He introduced the sport of canoeing into the United States. He was for a time United States Consul-General at Rome. Among his principal writings are "Domestic Explosives" (1877); "Shooting Stars" (1878); "Moral Pirates" (1880); "The Comic Liar" (1882); "A New Robinson Cru-

soe" (1888), etc; London correspondent "New York Times," 1900. He died Jan. 14, 1908.

ALDENHOVEN, a town of Prussia, Rhine province; 12 miles N. E. of Aix-la-Chapelle. Here the French, in 1793, under Dumouriez, were defeated by 50,000 Austrians, under Prince Josias of Coburg, and were prevented from making their contemplated invasion of Holland. In 1794 the French under Jourdon, numbering 35,000, conquered the Austrians under Clerfayt.

ALDER, the common name for a genus of plants (alnus), of the order *cupiliferæ* (oak family). In the eastern United States it is a very common shrub. On the W. coast it often attains a height of from 40 to 60 feet in favorable locations. It is found in temperate and cold regions. The species familiar in England has a wood soft and light, but very durable in the water, and therefore well adapted to mill work, sluices, piles of bridges, etc. Its bark and shoots are used for dye, and its branches for the charcoal employed in making gunpowder.

ALDERMAN, a title pertaining to an office in the municipal corporations of Great Britain and the United States. In early Saxon times the term was indefinitely applied, and was generally given to a person possessed of an office of rank or dignity. In the court of the corporation of London the aldermen have legislative and judicial authority, and are elected for life. In the United States the powers and duties of aldermen differ in the various States and cities. As a rule they are elected by popular vote and constitute the source of municipal legislation.

ALDERMAN, EDWIN ANDERSON, an American educator, born in Wilmington, N. C., May 15, 1861; was graduated at the University of North Carolina in 1882; was superintendent of the Goldboro city schools in 1884-1887; Assistant State Superintendent of Public Instruction in 1889-1892; Professor of English in the State Normal College in 1892; and Professor of Pedagogy in the University of North Carolina in 1892-1896. In the last year he was chosen President of the University of North Carolina, and in April, 1900, was elected President of Tulane University in New Orleans. He was chosen President of the University of Virginia in 1904. His publications include "Life of William Cooper," a signer of the Declaration of Independence; "School History of North Carolina"; "The Growing South"; etc.

ALDERNEY (French, *Aurigny;* Latin, *Riduna*), a British island in the English channel, 55 miles S. by E. of Portland Bill, 15 N. E. of Guernsey, 31 N. of Jersey, and 10 W. of Cape La Hague. The length of the island is 4¼ miles; its extreme breath, 1½ miles; and its area is 1,962 acres, or three square miles. The highest point is 281 feet above sea-level. To the S. the coast is bold and lofty; to the N. it descends, forming numerous small bays. The Caskets are a small cluster of dangerous rocks, 6¾ miles to the W., on which are three lighthouses. The soil in the center of the island is highly productive; and the Alderney cattle, a small but handsome breed, have always been celebrated. The population was originally French, but half the inhabitants now speak English, and all understand it. Protestantism has prevailed here since the Reformation. Alderney is a dependency of Guernsey, and subject to the British crown. The civil power is vested in a judge appointed by the crown, and six jurats who are chosen by the people. These, with 12 popular representatives or *douzeniers* (who do not vote), constitute the local legislature. Pop. about 3,000.

ALDINE EDITIONS, the books printed by Aldus Manutius and his family, in Venice (1490-1597). They comprise the first editions of Greek and Roman classics; others contain corrected texts of modern classic writers, as of Petrarch, Dante, or Boccaccio, carefully collated with the MSS. All of them are distinguished for the remarkable correctness of the typography. The editions published by Aldo Manuzio (1450-1515), the father, form an epoch in the annals of printing. No one had ever before used such beautiful Greek types, of which he got nine different kinds made, and of Latin as many as 14. It is to him, or rather to the engraver, Francesco of Bologna, that we owe the types called by the Italians *Corsivi*, and known to us as italics, which he used for the first time in the octavo edition of ancient and modern classics, commencing with Vergil (1501). From 1515 to 1533 the business was carried on by his father and brother-in-law, Andrea Torresano of Asola, and his two sons—the three Asolani. Paolo Manuzio (1512-1574), Aldo's son, was succeeded by his son, the younger Aldo (1547-1597). The printing establishment founded by Aldo continued in active operation for 100 years, and during this time printed 908 different works. The distinguishing mark is an anchor, entwined by a dolphin, with the motto either

of *"Festina lente"* or of *"Sudavit et alsit."* Among the Aldine works which have now become very rare may be mentioned the "Horæ Beatæ Mariæ Virginis," of 1497, the "Vergil" of 1501, and the "Rhetores Græci," not to mention all the editions, dated and undated, from 1490 to 1497.

ALDRICH, NELSON WILMARTH, an American politician, born in Foster, R. I., in 1841. His early life was spent in business and he became a partner in a wholesale grocery firm in Providence. He early showed an interest in and capacity for politics and was elected to the Rhode Island House of Representatives in 1875. Within a few years he was the chief political power in the State. He was elected to Congress in 1878, but resigned in 1881 to enter the Senate, to which he was successfully re-elected until 1911. His powerful personality and his deep knowledge of business and economics from the political standpoint made him a powerful factor in the Senate, especially in relation to measures affecting the tariff. He was chiefly responsible for the McKinley Bill in 1890. Greatly interested in financial matters, he was largely responsible for the Aldrich-Vreeland Currency Law. At the height of his power he was the most dominant figure in the Senate. At the expiration of his term in 1911 he declined renomination, undoubtedly foreseeing the conditions that were about to result from the splitting up of the Republican party, which took place in the following year. He was a chief authority on banking and finance and through his efforts banking laws were greatly improved. After his retirement he took no active part in politics, and died on April 16, 1915.

ALDRICH, THOMAS BAILEY, an American poet, essayist, and writer of fiction, born in Portsmouth, N. H., Nov. 11, 1836. He spent his early youth in Louisiana, but at the age of 17 entered a mercantile house in New York. Removing to Boston in 1866, he became editor of "Every Saturday," and, in 1881, editor of the "Atlantic Monthly." He has become almost equally eminent as a prose writer and poet. Among his prose works the best known are: "The Story of a Bad Boy" (1870); "Marjorie Daw and Other People" (1873); "Prudence Palfrey" (1874); "The Queen of Sheba," a romance of travel (1877); "The Stillwater Tragedy" (1880). Of his poems, most are included in "Complete Poems" (1882) and "Household Edition" (1895). He died in Boston, Mass., March 19, 1907.

ALDRICH WILLIAM SLEEPER, an American educator, born in Philadelphia in 1863. He graduated from the United States Naval Academy in 1883, and in the following year received a degree in engineering from the Stevens Institute of Technology. After teaching for several years in high schools he became a member of the staff of Johns Hopkins University. From 1893 to 1899 he was professor of mechanical engineering and director of mechanical arts at West Virginia University. From 1899 to 1901 he was professor and head of the Department of Electrical Engineering at the University of Illinois. From 1901 to 1911 he was director of the Thomas S. Clarkson School of Technology. He was a member of many scientific societies. He wrote much on building construction and architecture and manuals for electrical engineering laboratories.

ALE, the current name in England for malt liquor in general before the introduction of "the wicked weed called hops" from the Netherlands, about the year 1524. The two names, ale and beer, are both Teutonic, and seem originally to have been synonymous. In the eastern counties of England, and over the greater portion of the country, ale means strong, and beer, small, malt liquor; while in the W. country, beer is the strong liquor and ale the small. The ales of Edinburgh, Wrexham, and Alloa have a high reputation. Burton ale is the strongest made, containing as much as 8 per cent. of alcohol; while the best brown stout has about 6 per cent., and table-beer only 1 or 2 per cent. India pale ale differs chiefly in having a larger quantity of hops.

ALEMAN, MATTEO (ä-lā-män'), a Spanish novelist, born in Seville about 1550. For some time an official in the royal treasury, he resigned or was dismissed, and about 1608 went to Mexico. His fame rests on the satirical romance, "The Life and Deeds of the Picaroon Gusman de Alfarache," one of the most famous representatives of the "picaresque" novel. Its first part, under the title of "Watch-Tower of Human Life," appeared in 1599. The work was translated into every European language, and, in 1623, even into Latin. He died in Mexico after 1609.

ALEMANNI or ALAMANNI, a confederacy of several German tribes which, at the commencement of the 3d century after Christ, lived near the Roman territory, and came then and subsequently into conflict with the imperial troops.

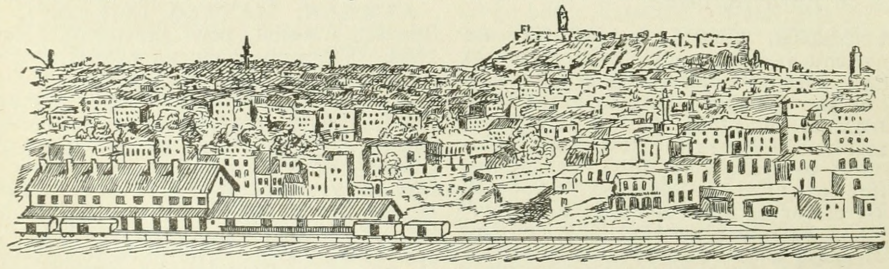
Caracalla first fought with them in 213, but did not conquer them; Severus was likewise unsuccessful. About 250 they began to cross the Rhine westward, and in 255 they overran Gaul along with the Franks. In 259 a body of them was defeated in Italy at Milan, and in the following year they were driven out of Gaul by Postumus. In the 4th century they crossed the Rhine and ravaged Gaul, but were severely defeated by the Emperor Julian and driven back. Subsequently they occupied a considerable territory on both sides of the Rhine; but at last Clovis broke their power in 496 and deprived them of a large portion of their possessions. Part of their territory was latterly formed into a duchy called Alemannia or Suabia. It is from the Alemanni that the French have derived their names for Germans and Germany.

ALEMBIC, a simple apparatus sometimes used by chemists for distillation. The body contains the substance to be distilled, and is like a bottle, bulging below and narrowing toward the top; the head, of a globular form, with a flat under-ring, fits onto the neck of the cucurbit, condenses the vapor from the heated liquid, and receives the distilled liquid on the ring inclosing the neck of the lower vessel, and thus causes it to find egress by a discharging pipe into the third section, called the receiver.

ALENÇON (al-an-sôn'), an ancient countship of France; united to the crown in 1212 by Philip Augustus. Later it became a duchy, dependent on the house of Valois. JEAN IV., born in 1409, in 1417 lost the duchy to the King of England. He distinguished himself in the wars against England and, when they were driven out, received his duchy back. Twice he was condemned to death on account of supposed intrigues in favor of England against Charles VIII. and Louis XI., but was pardoned, and died in 1476. RENÉ, son of Jean IV., aroused suspicion, and Louis XI., in 1481, had him confined three months in an iron cage. After the death of Louis XI. he received his freedom, title, and estates back from Charles VIII., and died Nov. 1, 1492. The son of René, Duke CHARLES IV., born in 1489, married MARGUERITE DE VALOIS, sister of Francis I. At the battle of Pavia he was commander of the left wing. At a decisive moment he and his troops took to flight and caused the misfortune of the day, the capture of King Francis I. He died April 11, 1525, and with him perished the house of Alençon. His wife, MARGUERITE, remained in possession of the duchy until her death in 1549. From 1549 to 1566 CATHERINE DE MEDICI was Duchesse d'Alençon, and Charles IX. presented it to his younger brother, FRANCIS OF ANJOU. After his death it was reunited to the crown. Henry IV. transferred the duchy in 1595 to the Duke of Württemberg, who willed it in 1608 to his son, from whom, in 1612, Marie de Medici purchased it back for the crown. The title is now borne by a grandson of Duke Philippe de Nemours. See BOURBON.

ALENÇON, a city of France, and capital of the department of Orne, on the Sarthe. Its Cathedral of Notre Dame, built between 1553 and 1617, is in the Gothic style. The Hôtel de Ville was built in 1783 on the site of the ancient castle of the dukes of Alençon, two of the towers of which are still preserved and used as prisons. There are manufactories of muslin, linen, leather, and a lace called point d'Alençon. It has also a lively trade in horses. During the Franco-Prussian War the city was captured by the Grand-Duke of Mecklenburg. Pop. about 17,500.

ALEPPO, a city of Turkey in Asia, in northern Syria, on the Koeik river, 71 miles E. of the Mediterranean. The foundation of Aleppo dates back to about 2,000 years B. C. Its first name was Khaleb, which the Greeks called Chlybon. After the fall of Palmyra, it became of great importance. Seleucos Nikator beautified the city and called it Beroyia, which name it bore till its conquest by the Arabs; then the name was Haleb,



ALEPPO

which the Italians called Aleppo. It was conquered by the Saracens in 636; was the seat of a Seljuk sultanate in the 11th and 12th centuries; was plundered by Timur in 1402; in the 15th century became the great emporium of trade between Europe and Asia; was taken by the Turks in 1517; and was nearly destroyed by an earthquake in 1822, when it lost two-thirds of its 250,000 inhabitants. The present inhabitants are Turks, Greeks, Armenians, and Jews. In spite of the earthquakes and insurrections, which devastated the city, there is now a great trade there. The chief exports are apples, dyestuffs, cotton, tobacco, wheat, nuts, oil, etc. Pop. about 250,000. It was occupied by British forces in 1918.

ALESSANDRIA, city and capital of the province of Alessandria, Italy; on the river Tanaro. It was built in 1168 for protection against Emperor Frederick I. Its original name, Cæsarea, was changed to Alessandria in honor of Pope Alexander III. It was taken by Sforza, Duke of Milan, in 1522, by Prince Eugene in 1707, and ceded to Savoy in 1713 by the Peace of Utrecht. By the armistice of Alessandria, after the battle of Marengo (1800), all of north Italy as far as the Mincio was ceded to France. It was taken by the Austrians in 1821, and became the headquarters of the Piedmontese in the insurrection of 1848-1849. The richly decorated cathedral was rebuilt in 1823. Pop. about 72,500. The province has an area of 1,980 square miles. Pop. about 900,000. A considerable trade is conducted in linen, silk, and woolen stuffs, hats, and artificial flowers.

ALEUTIAN (a-lū'shi-an) **ISLANDS**, or **CATHERINE ARCHIPELAGO**, a group of about 150 islands, extending W. from Alaska peninsula for a distance of 1,650 miles; belongs to Alaska Territory. The principal islands are Umnak and Unalaska. The inhabitants are nearly all Aleuts, a people allied to the Eskimos. These islands were discovered by Bering in 1728. Pop. about 3,000.

ALEWIFE, a North American fish (*clupea pseudoharengus*) belonging to the same family as the herring and the shad, and closely allied to them. It is caught in seines with the shad, in large quantities, at many places along the Atlantic coast from North Carolina to Nova Scotia, notably in Chesapeake Bay and the harbor of St. John, N. B. The name is given also to other related species and to fish of other families, as the round pompano of the Bermudas and the allice-shad of England.

ALEXANDER, a name of various ancient writers, philosophers, etc. (1) ALEXANDER of Ægæ; a peripatetic philosopher of the 1st century A. D.; tutor of Nero. (2) ALEXANDER the Ætolian; a Greek poet who lived at Alexandria about 285-247 B. C. (3) ALEXANDER of Aphrodisias, surnamed Exegetes; lived about 200 A. D.; a learned commentator on the works of Aristotle. (4) ALEXANDER CORNELIUS, surnamed Polyhistor, of the 1st century B. C. The surname Polyhistor was given him on account of his prodigious learning. (5) A Greek rhetorician and poet, surnamed Lychnus; lived about 30 B. C., wrote astronomical and geographical poems. (6) ALEXANDER NUMENIUS; a Greek rhetorician and teacher of elocution, of the 2d century A. D., two of whose works are historically known. (7) A Greek rhetorician of the 2d century A. D., surnamed Peloplaton, who vanquished Herodes Atticus in a rhetorical contest. (8) ALEXANDER PHILALETHES; a physician of the 1st century B. C. who succeeded Zeuxis as president of the famous Herophilean school of medicine. (9) SAINT ALEXANDER (died 326 A. D.); the Patriarch of Alexandria from 312 A. D.; an opponent of Arius; member of the Council of Nice (325 A. D.); commemorated in the calendar Feb. 26. (10) ALEXANDER of Tralles; an eminent physician of Lydia, of the 6th century A. D.; author of two extant Greek works.

ALEXANDER, the name of eight Popes (1) Alexander I., a bishop of Rome about 109 A. D., not then having the title of Pope, but now reckoned in the list. He is supposed to have died a martyr's death.

2. ALEXANDER II., Anselmo Baggio, a native of Milan; he lived for some time at the court of Henry III., and in 1056 or 1057 became Bishop of Lucca. In 1059 he became papal legate at Milan, and, on Oct. 1, 1061, through the zeal of Hildebrand, he was raised to the papal throne.

3. ALEXANDER III. (died in 1181), Rolando Ranuci; Pope 1159-1181. His career is historically important because of his vigorous prosecution, in opposition to Frederick Barbarossa, of the policies begun by Hildebrand. Three anti-Popes, Victor IV., Pascal III. and Calixtus III., had been confirmed in succession by the emperor. Alexander succeeded, and after the decisive victory at Legnano compelled Frederick's submission. The papal struggle was carried on in England by Thomas à Becket, ending in a victory for Alexander. Important changes were made by Alexander III., increasing ecclesiastical powers and privileges.

4. ALEXANDER IV., Pope 1254-1261; of weak character. In his battle with Manfred of Sicily, he suffered bitter humiliations and, deserted by his bishops, escaped from Rome. He died in Viterbo, in 1261.

5. ALEXANDER V., Pietro Philargi, of Candia. He was for some time professor in Paris, and in 1402 was made Archbishop of Milan, and in 1404 cardinal. In 1409, after the deposition of the rival Popes, Gregory XII. and Benedict XIII., he was elected Pope by the Council of Pisa. He died at the age of 70.

6. ALEXANDER VI., Rodrigo Lenzuoli Borgia, a Spaniard, of Valencia, son of Isabelle Borgia, whose family name he took, born Jan. 1, 1431. At first he studied law, and then was appointed by his uncle, Pope Calixtus III., a cardinal before he was 25 years old. In 1458 he was made Archbishop of Valencia, and as such he led a dissipated life. He was crowned Aug. 26, 1492, with great pomp and solemnity. His daughter, Lucretia Borgia, was married to Giovanni Sforza, Lord of Pesaro, afterward to Alfonso di Biseglia, then thirdly to Alfonso d'Este, Prince of Ferrara. His son, Cæsar, who afterward got complete control of him, was made Archbishop of Valencia, and, in 1493, was appointed cardinal. Afterward, in order to create for him a secular principality, he made an alliance with Louis XII. of France. Cæsar Borgia, therefore, left the Church and became Duke of Valentinois. In 1501 he became Duke of the Romagna. On May 4, 1493, Alexander issued a bull dividing the New World between Spain and Portugal; on May 23, 1498, the execution of Savonarola took place by his order; and in 1501 he instituted the censorship of books. Alexander died Aug. 18, 1503, from poison.

7. ALEXANDER VII., Fabio Chigi, of Siena, was, during the treaties of peace at Münster and Osnabrück, papal nuncio in Germany. He was chosen Pope April 7, 1665, through the influence of France. During his rule Rome was beautified in many directions, especially through the colonnade before St. Peters. He was a poet and friend of the arts and sciences.

8. ALEXANDER VIII. (1610-1691), Pietro Ottoboni, of Venice; Pope 1689-1691; assisted Italy in wars against the Turks; was a notable nepotist.

ALEXANDER I., King of Greece, born on Aug. 1, 1893, second son of King Constantine of Greece. Upon the abdication of the latter, which was forced by the Allies, Alexander ascended the throne, June 12, 1917. He declared himself the guardian of the Constitution and made it clear that he would henceforth act in co-operation with the Entente. Venizelos was made Premier on June 27, 1917. Alexander died Oct. 25, 1920, from the effects of the bite of a monkey.

ALEXANDER I., Emperor of Russia, was born Dec. 23, 1777. In 1801 he succeeded his father, the murdered Emperor Paul. Many reforms were at once initiated as to education, serfdom, press censorship. In 1805, joining the coalition against Napoleon, he was present at the battle of Austerlitz, where the allied armies of Austria and Russia were defeated, and retired with the remains of his forces into Russia. Next year he came forward as the ally of Prussia, but in 1807, after the battles of Eylau and Friedland, he was obliged to conclude the Peace of Tilsit. In 1808 he declared war on England, and, attacking her ally Sweden, wrested therefrom the province of Finland. In the war of France against Austria in 1809 he took only a lukewarm part; against Turkey he renewed hostilities, which were continued till the Peace of Bucharest in 1812. The unnatural alliance of Alexander with France could not, however, be maintained; and though he was not with his troops during the French invasion of Russia (1812), he took an active part in the great struggles of 1813 and 1814. At the occupation of Paris after the downfall of Napoleon in 1814, he was the central figure, and was received with enthusiasm in London. At the Congress of Vienna he laid claim to Poland, but promised to confer on it a constitution. On Napoleon's return from Elba, Alexander urged the energetic renewal of the war. The most important political outcome of this period was the Holy Alliance, founded by Alexander, and accepted by all the Christian powers of Europe, except Great Britain. Many causes contributed to force him into a reactionary course, especially the influence of Metternich. He died at Taganrog, Dec. 1, 1825.

ALEXANDER II., Emperor of Russia (1855-1881), was born April 29, 1818. He was carefully educated by his father, Nicholas. At 16 he was declared of age, made commandant of the lancers of the guard, hetman of the Cossacks, first aide-de-camp of the Emperor, and subjected daily to a life of manœuvring, reviewing, and military parade. He then traveled through Germany, and in 1841 concluded a marriage with the Princess Marie (1824-1880), daughter of the Grand Duke of Hesse. By his dexterous and winning manners he found his way to the hearts of the Finns, and weakened their ancient love of independence.

On his accession to the throne, March 2, 1855, he found himself in a very critical position. He had two parties to conciliate—the old Muscovite party, zealous for the prosecution of the Crimean War, and the more peaceable portion of the nation, with whom he sympathized. By temporizing he was enabled to conclude a peace. Throughout his reign he had to hold the balance between conservatives and extreme radicals, but succeeded in guiding and promoting reform. The grand achievement of his reign, which was in great measure his own deed, was the emancipation of the serfs—23,000,000 souls—in 1861. Reforms of the tribunals, of civil and criminal procedure, and of municipal institutions followed. He resisted strenuously all foreign interference with Polish affairs during the insurrection of 1863, which was suppressed with great severity. During his reign the Russian empire was widely extended in two important regions—in the Caucasus and in Central Asia. During the Franco-Prussian War of 1870-1871 Alexander maintained a sympathetic attitude toward Germany. The Emperor shared the national sympathy with the Slavic races under Turkish rule, and took the field with the army during the momentous war between Russia and Turkey in 1877-1878. But the most remarkable feature of the second half of his reign was the struggle of the Russian autocracy with the revolutionary party, the so-called Nihilists. His government repressed the revolutionists most severely, and they sought vengeance by attacking the person of the Emperor and his officers. Repeated attempts were made to assassinate Alexander. On March 13, 1881, he was so severely injured by a bomb thrown at him near his palace that he died a few hours after.

ALEXANDER III., of Russia, son of Alexander II., was born March 10, 1845, and married the daughter of the King of Denmark in 1866. After his father's death, through fear of assassination, he shut himself up in his palace at Gatchina. His coronation was postponed till 1883. Through the fall of Merv, the subjugation of the Turkomans in Central Asia was completed. In European affairs, he broke away from the triple alliance between Russia, Germany, and Austria, and looked rather to France. His home policy was reactionary, though strong efforts were made to prevent malversation by officials, and stern economies were practiced. The liberties of the Baltic provinces and of Finland were curtailed, the Jews were oppressed, and old Russian orthodoxy was favored. Several Nihilist attempts were made on his life, and he kept himself practically a prisoner in his palace. He died at Livadia, Nov. 1, 1894.

ALEXANDER I., King of Scotland, the fourth son of Malcolm Canmore, was born about 1078, and in 1107 succeeded his brother, Edgar, only, however, to that part of the kingdom N. of the Firths of Forth and Clyde. He married Sibylla, a natural daughter of Henry I. of England, and his reign was comparatively untroubled. His determined resistance to the claims of York and Canterbury to supremacy over the see of St. Andrews did much to secure the independence, not only of the Scottish Church, but of Scotland itself. He died at Stirling in 1124.

ALEXANDER II., born at Haddington in 1198, succeeded his father, William the Lion, in 1214. He early displayed wisdom and strength of character. His entering into a league with the English barons against King John drew down upon him and his kingdom the papal excommunication; but two years later the ban was removed. On Henry III.'s accession to the English throne, Alexander brought the feuds of the two nations to a temporary close by a treaty of peace (1217), in accordance with which he married Henry's eldest sister, the Princess Joan (1221). The alliance thus established was broken after her death without issue (1238), and the second marriage of Alexander with the daughter of a noble of France. In 1244 Henry marched against Scotland, to compel Alexander's homage; but a peace was concluded without an appeal to arms. In 1249, while engaged in an expedition to wrest the Hebrides from Norway, Alexander died of fever on Kerrera, near Oban.

ALEXANDER III., King of Scotland, born in 1241, in 1249 succeeded his father, Alexander II., and in 1251 married the Princess Margaret (1240-1275), eldest daughter of Henry III. of England. Very shortly after he had come of age he was called to defend his kingdom against the invasion of Haco, King of Norway (1263), whose utter rout at Largs secured to Alexander the allegiance both of the Hebrides and of the Isle of Man. The alliance between Scotland and Norway was strengthened in 1282 by King Eric's marriage to Alexander's only daughter, Margaret (1261-1283). His only surviving son died without issue in 1284; and next year Alexander contracted a second marriage with Joleta, daughter of the Count de Dreux. The hopes of the nation were soon after clouded by his untimely death in 1286.

ALEXANDER I., King of Serbia, born Aug. 14, 1876; son of King Milan I. In 1899 Milan abdicated and proclaimed Alexander king, under a regency till he should attain his majority (18 years). On April 13, 1893, when in his 17th year, Alexander suddenly took the royal authority into his own hands, and summarily dismissed the regent. On Aug. 5, 1900, he married Mme. Draga Maschin. On the night of June 10, 1905, military conspirators invaded the royal palace and the king and queen were killed.

ALEXANDER ARCHIPELAGO, or ALEXANDER ISLANDS, a group of islands on the W. coast of North America, extending from 54° 40′ N. to 58° 25′ N.; belonging to Alaska Territory. The principal islands are Chichagof and Prince of Wales.

ALEXANDER, BOYD, an English naturalist and explorer, born in 1873. He was educated at Radley College. He enlisted in the army and later served with the Gold Coast Constabulary. His chief interest was in exploration, and he made many journeys to many parts of the world, especially to less known regions of Africa. In 1909 he explored several islands in the Gulf of Guinea and made a special study of the volcanic mountains in the Kameroon. He studied and described many new species of birds. He made the first ascent of Mount St. Isabel. The Royal Geographical Society of Antwerp awarded him a gold medal in 1907, and he received also gold medals from the Royal Geographical Society of London in 1908. He was murdered by natives in May, 1910, while carrying on explorations in the French Congo. He wrote much on scientific subjects and also "From the Najar to the Nile" (1907).

ALEXANDER, MRS. CECIL FRANCES (HUMPHREY), an Irish poet, born in County Wicklow in 1818. She is best known as a writer of hymns and religious poems. Among the most noted are the hymns "Roseate Hue of Early Dawn" and "All Things Bright and Beautiful." Her most famous poem is "The Burial of Moses." She died in Londonderry, Oct. 12, 1895.

ALEXANDER, SIR GEORGE, an English actor and manager, born at Reading, England, in 1858. He was educated in the public schools at Stirling and Edinburgh. In 1881 he joined Henry Irving's company at the Lyceum Theater, where he exhibited unusual talent and won pronounced success. He accompanied Irving to the United States in 1884. Later he managed several of the most important theaters in London, and he was said to have produced more original plays by English authors than any other manager. He was especially notable in Shakespearean plays. He was president of the Royal General Theatrical Fund.

ALEXANDER, JOHN WHITE, an American artist, born in Allegheny City, Pa., in 1856. He early showed great talent in drawing, and at the age of 18 became an apprentice in the art department of "Harper's Weekly." After several years he went to Munich to study there as well as in other European cities for several years. He returned to New York in 1881, and at once achieved great success in portrait painting. He exhibited in the Paris Salon in 1893 and made a brilliant success. He spent part of his time in Paris and part in New York. In 1901 he was created Chevalier of the Legion of Honor, and in 1902 became a member of the National Academy of Design, of which he was president from 1909 until his death. A member of the National Institute of Arts and Letters, he was awarded honorary degrees by Princeton and other universities, and received gold medals at the Paris Exposition and at the World's Fair in St. Louis. He was one of the most talented modern painters and exercised great influence on the development of art in the United States. He died in 1915.

ALEXANDER, MRS., pseudonym of ANNIE HECTOR, an Irish novelist, born in Dublin in 1825. She was a prolific and popular novelist. Her books include "The Wooing O't" (1873); "Ralph Wilton's Weird" (1875); "Her Dearest Foe" (1876); "The Freres" (1882); "A Golden Autumn" (1897); "A Winning Hazard" (1897). She died in 1902.

ALEXANDER SEVERUS, a Roman emperor, born in 205 A. D.; was the cousin and adopted son of Heliogabalus, whom he succeeded in 222. He sought the society of the learned; Paulus and Ulpianus were his counselors; Plato and Cicero were, next to Horace and Vergil, his favorite authors. Although a pagan, he reverenced the doctrines of Christianity. Beloved as he was by the citizens on account of his equity, he soon became an object of hatred to the unruly prætorian guards. His first expedition (231-233) against Artaxerxes, King of Persia, was terminated by a speedy overthrow of the enemy; but during one which he undertook in 234 against the Germans on the Rhine an insurrection broke out among his troops, headed by Maximus, in which Alexander was murdered (235).

ALEXANDER THE GREAT, son of Philip of Macedon and Olympias, daughter of Neoptolemus of Epirus, was born at Pella, 356 B. C. His mind was formed chiefly by Aristotle. Alexander was 16 years of age when his father marched



ALEXANDER THE GREAT

against Byzantium, and left the government in his hands during his absence. Two years afterward he displayed singular courage at the battle of Chæronea (338 B. C.), where he overthrew the Sacred Band of the Thebans. The father and son quarreled, however, when the former divorced Olympias. Alexander took part with his mother, and fled to Epirus, to escape his father's vengeance; but, receiving his pardon soon afterward, he returned, and accompanied him in an expedition against the Triballi, when he saved his life on the field. Philip, being appointed generalissimo of the Greeks, was preparing for a war with Persia when he was assassinated (336 B. C.), and Alexander, not yet 20 years of age, ascended the throne. After punishing his father's murderers, he marched to Corinth and obtained command of the forces against Persia. On his return to Macedon, he found the Illyrians and Triballi up in arms, whereupon he forced his way through Thrace, and was everywhere victorious. But now the Thebans had been induced, by a report of his death, to take up arms, and the Athenians, stimulated by the eloquence of Demosthenes, were preparing to join them. To prevent this coalition, Alexander rapidly marched against Thebes, which, refusing to surrender, was conquered and razed to the ground. Six thousand of the inhabitants were slain, and 30,000 sold into slavery. This severity struck terror into all Greece.

Alexander now prepared to prosecute the war with Persia. He crossed the Hellespont in the spring of 334 B. C., with 30,000 foot and 5,000 horse, attacked the Persian satraps at the river Granicus, and gained a victory, overthrowing the son-in-law of Darius with his own lance. Halicarnassus was vigorously defended by Memnon, the Persian leader, but was taken. He marched through Gordium, where he cut the famous Gordian Knot, defeated a vast army of Persians and Greek mercenaries at Issus, capturing the family of Darius; reduced the cities of Phœnicia, and pressed on into Egypt. Here he founded Alexandria (331).

Such marvelous success dazzled his judgment and inflamed his passions. He became a slave to debauchery, and at the instigation of Thaïs, an Athenian courtesan, he set fire to Persepolis, the wonder of the world, and reduced it to a heap of ashes. In 329 he overthrew the Scythians on the banks of the Jaxartes; and next year he subdued the whole of Sogdiana, and married Roxana, whom he had taken prisoner. In 326 B. C., proceeding to the conquest of India, Alexander crossed the Indus and pursued his way to the Hydaspes (Jhelum). He there was opposed by Porus, a native prince, whom he overthrew after a bloody contest, and there he lost his charger Bucephalus. Thence he marched as lord of the country through the Punjab, establishing Greek colonies. Of all the troops which had set out with Alexander, little more than a fourth part arrived with him in Persia (325 B. C.). At Susa he married Stateira, the daughter of Darius.

At Babylon he was busy with gigantic plans for the future, both of conquest and civilization, when he was suddenly taken ill after a banquet, and died in 323 B. C.

ALEXANDRIA, a city of Egypt, founded by Alexander the Great in 331 B. C. Before the city, in the Mediterranean, lay an island, up on the N. E. point of which stood the famous lighthouse, the Pharos, built in the time of Ptolemy I., in the 3d century B. C. and said to have been 400 feet high. The plan of Alexandria was designed by the architect Deinocrates, and its original extent is said to have been about 4 miles in length, with a circumference of 15 miles. It was intersected by two

straight main streets, crossing each other at right angles in a large square, and adorned with handsome houses, temples, and public buildings. The most magnificent quarter of the city was that called the Brucheion, which ran from the center to the eastern harbor. This quarter of the city contained the palaces of the Ptolemies, the Museum, for centuries the focus of the intellectual life of the world, and the famous library; the mausoleum of Alexander the Great and of the Ptolemies the temple of Poseidon, and the great theater. To the S. was the beautiful gymnasium. The Serapeum, or temple of Serapis, stood in the western division of the city, which formed the Egyptian quarter, and was called Rhacōtis; a small town of that name had occupied the site before the foundation of Alexandria. To the W. of the city lay the great Necropolis, and to the E. the race-course and suburbs of Nicopolis. From the time of its foundation, Alexandria was the Greek capital of Egypt. After the death of Alexander the Great, Alexandria became the residence of the Ptolemies. They made it, next to Rome and Antioch, the most magnificent city of antiquity, as well as the chief seat of Greek learning and literature.

Alexandria had reached its greatest splendor when, on the death of Cleopatra, the last of the Ptolemies, in 30 B. C., it came into the possession of the Romans. In the reign of Caracalla, however, it suffered severely; and the rise of Constantinople promoted the decay of Alexandria. Christianity was introduced, according to tradition, by St. Mark. In the 2d century its adherents were very numerous. The Serapeum, the last seat of heathen theology and learning, was stormed by the Christians in 389 A. D., and converted into a Christian church. Alexandria was a chief seat of Christian theology till it was taken by the Arabs, under Amru, in 641, at which time it was much injured. The choice of Cairo as capital of the Egyptian caliphs hastened the now rapid decay of the city, and when, in 1517, the Turks took the place, the remains of its former splendor wholly vanished, walls and buildings being reduced to ruins. Under Mehemet Ali, however, the tide turned, and the city recovered rapidly. It is now again one of the most important commercial places on the Mediterranean. In 1882, during the rising of Arabi Pasha, serious damage was done to the city. The Europeans were maltreated; and as Arabi would not desist from strengthening the fortifications, an English fleet, in the interests of the Khedive, bombarded the forts of Alexandria, and British forces occupied the city.

The present city (called Skanderieh by the Arabs) is not situated exactly on the site of the old one, but is chiefly built on the mole. The ever increasing Frankish quarters have quite a European appearance, and swarm with cafés, shops, theaters, and the like. The castle stands near the old Pharos, and the handsome new lighthouse has a revolving light, visible at a distance of 20 miles.

Of the few remaining objects of antiquity the most prominent is Pompey's Pillar, as it is erroneously called. Pop. about 450,000.

ALEXANDRIA, a city of Louisana, the county-seat of Rapides parish, about 192 miles N. W. of New Orleans. It is on the Chicago, Rock Island and Pacific, the Louisiana and Arkansas, the St. Louis, Iron Mountain and Southern, and other railroads. It is also on the Red river. The city is the center of important commercial and industrial interests, has manufactures of cotton, cottonseed oil, sugar, molasses, and lumber, and is also important as an agricultural center, producing corn, rice, fruit, and vegetables. The city has a handsome Government building, public library, Elks' Home, and an opera house. Pop. (1910) 11,213; (1920) 17,510.

ALEXANDRIA, a city, port of entry, and county-seat of Alexandria co., Va.; on the Potomac river, the Pennsylvania and Southern railroads and trolley line connecting with Washington, D. C., and Mt. Vernon; 6 miles S. of Washington. The river here expands to the width of a mile, and gives the city an excellent harbor that will accommodate the largest ships. The city is an important trade center; has manufactures aggregating $20,000,000 in value annually; and is noted for its educational institutions, which include Washington High School, Potomac, Mt. Vernon and St. Mary's Academies, and, near by, the Theological Seminary and High School of the Diocese of Virginia (Protestant Episcopal). There are two National banks, public school property valued at $35,000, and daily and weekly periodicals. General Braddock made his headquarters here in 1755, and Colonel Ellsworth was shot in the Marshall House, while removing a Confederate flag, in 1861. Pop. (1910) 15,329; (1920) 18,060.

ALEXANDRIAN CODEX, an important manuscript of the sacred Scriptures in Greek, now in the British Museum. It is written on parchment in finely formed

uncial letters, and is without accents, marks of aspiration, or spaces between the words. Its probable date is the middle of the 5th century. With the exception of a few gaps, it contains the whole Bible in Greek (the Old Testament being in the translation of the Septuagint), along with the epistles of Clemens Romanus, of whose genuine epistle to the Corinthians it is the only manuscript extant. This celebrated manuscript belonged, as early as 1098, to the library of the Patriarch of Alexandria. In 1628 it was sent as a present to Charles I. of England, by Cyrillus Lucaris, Patriarch of Constantinople.

ALEXANDRIAN LIBRARY, a remarkable collection of books, the largest of the ancient world, was founded by the first Ptolemy, and fostered by his son. It quickly grew, and already in the time of the first Ptolemy, Demetrius Phalereus had 50,000 volumes or rolls under his care. During its most flourishing period, under the direction of Zenodotus, Aristarchus of Byzantium, Callimachus, Apollonius Rhodius, and others, it is said to have contained 490,000, or, according to another authority, including all duplicates, as many as 700,000 volumes. During the siege of Alexandria by Julius Cæsar, this part of the library was destroyed by fire; but it was afterward replaced by the collection of Pergamos, which was presented to Cleopatra by Mark Antony. When Theodosius the Great permitted all the heathen temples in the Roman empire to be destroyed, a mob of Christians wrecked the temple containing the library (391 A. D.). In 641 Arabs under the Caliph Omar completed the destruction of the library treasures.

ALEXANDRIAN SCHOOL, the common designation of a series of scientific endeavors which were founded and encouraged through the generosity of the Ptolemies, and which had their seat in Alexandria and continued for more than 700 years, from 300 B. C. to 500 A. D. The basis of these schools was the Museion (museum) where the scientists lived and taught as pensioners at the public cost. For the use of these learned men two libraries were founded by the Ptolemies. See ALEXANDRIAN LIBRARY.

ALEXANDROPOL (formerly Gumri), an important fortress and the largest town in the Erivan district of Russian Armenia. It lies on a treeless plateau on the road from Erivan to Kara. The stronghold gives the Russians complete command of the headwaters of the Euphrates. The silk trade is actively carried on in the town. Pop. about 40,000.

ALEXIUS COMNENUS, one of the ablest rulers of the Byzantine empire, was born at Constantinople in 1048. He was the nephew of the Emperor Isaac Comnenus, on whose abdication, in 1059, his own father refused the purple; and Alexius was, in 1081, elevated by his soldiers to the throne. Everywhere he was encompassed with foes. The Scythians and Turks were pouring down from the N. and N. E.; the fierce Normans, who had effected a lodgment in Sicily and Italy, were menacing his western provinces; and, in 1096, the myriad warriors of the first crusade burst into his empire on their way to Palestine, and encamped around the gates of his capital. Yet he contrived to avoid all perils by the wisdom of his policy, the mingled patience and promptitude of his character, his discipline in the camp, and his humanity on the throne. He died in 1118.

ALEY, ROBERT JUDSON, American scientist and educator, born in Coal City, Ind., in 1863. After graduating from Indiana University in 1888, he took postgraduate studies at Leland Stanford Jr. University and the University of Pennsylvania, taught in the common and high schools, and was appointed director of mathematics in Indiana University in 1887. He remained in this position until 1909, when he was appointed Superintendent of Public Instruction and in the following year was appointed president of the University of Maine. Editor of several educational journals and a member of many learned and scientific societies, he was also author of "The Geometry of the Triangle" (1897); "The Essentials of Algebra" (1904); "Story of Indiana" (1912).

ALFALFA, also known as **LUCERNE**, a plant belonging to the legumes, used widely as a forage and hay crop for stock. It had its origin in central western Asia, where it had been under cultivation for thousands of years. Spanish explorers introduced it into Mexico and South America. It was first introduced into the United States in 1854, when it was brought to California from Chile. Its use grew rapidly, especially in the semi-arid regions of the Pacific and Rocky Mountain States. It has come to be one of the most important crops of the irrigated regions of the West. It is also extensively grown in other portions of the United States.

ALFIERI (alf-yā'rē), **VITTORIO, COUNT**, an Italian dramatist, born at Asti in Piedmont, Jan. 17, 1749. He came into his vast paternal inheritance at the age of 14; and two or three years after-

ward began a series of travels which extended over nearly all the European countries, returning to Turin, 1772. A love affair turned his mind toward literature, and his tragedy "Cleopatra" was produced in Turin in 1775. This and his other tragedies, "Polinice," "Antigone," "Brutus" are on classic themes. "Saul," founded on Hebrew sacred history, was by far the most popular of Alfieri's dramas. The "Filippo" presents, by the hand of a master, the somber character of Philip II. of Spain. He wrote in all 21 tragedies and six comedies, and composed many sonnets; among his odes are five on American independence. His prose works comprise an essay on "Tyranny," a volume of essays on "Literature and Government," and "Memoirs of his Life." He died at Florence, Oct. 8, 1803.

ALFONSO, or **ALPHONSO, I.** (El Conquistador, "The Conqueror"), earliest King of Portugal, was the son of Henry of Burgundy, conqueror and first Count of Portugal. Born in 1110, he was but two years of age at his father's death, so that the management of affairs fell into the hands of his ambitious and dissolute mother, Theresa of Castile. Wresting the power from her in 1128, he turned his sword against Castile and the Moors, and defeated the latter, after a bloody struggle, at Ourique, July 25, 1139, proclaiming himself King of Portugal on the field of battle. He took Lisbon (1147), and, later, the whole of Galicia, Estremadura, and Elvas. He died at Coimbra, Dec. 6, 1185.

ALFONSO III., surnamed THE GREAT, King of Leon, Asturias, and Galicia, succeeded his father, Ordoño, in 866. After reducing to obedience his jealous and factious nobles, he turned his arms against other enemies, fought through more than 30 campaigns and gained numerous victories over the Moors, occupied Coimbra, and extended his territory as far as Portugal and Old Castile. In 888 he crushed a revolution headed by his son Garcia. A second conspiracy, instigated by the Queen, was successful and he was forced to abdicate. Once again the old hero was called upon to save his country, and lead its armies against the invading Moors. After returning in triumph, he died at Zamora, 910.

ALFONSO V., King of Aragon and Navarre, but Alfonso I. of Naples and Sicily ("the Magnanimous"), succeeded his father in 1416, when but 15 years old. Summoned to her help by Queen Joanna II. of Naples, he defeated her foes, Sforza and Louis of Anjou, but lost her favor by throwing into prison her minion Caraccioli. The fickle queen now declared his rival Louis her successor. At her death in 1435, Alfonso resolved to claim the kingdom, but found himself opposed by Duke René of Lorraine, whom Joanna had appointed her successor after the death of Louis. Rome and Genoa sided with René, and the Genoese fleet attacked and defeated that of Alfonso, the monarch himself being taken prisoner. He was sent to Duke Philip of Milan, who, charmed by his manner and talents, soon set him at liberty, and even formed an alliance with him. After a five years' warfare, Alfonso was successful, and entering Naples in triumph, was recognized as its king by the Pope.

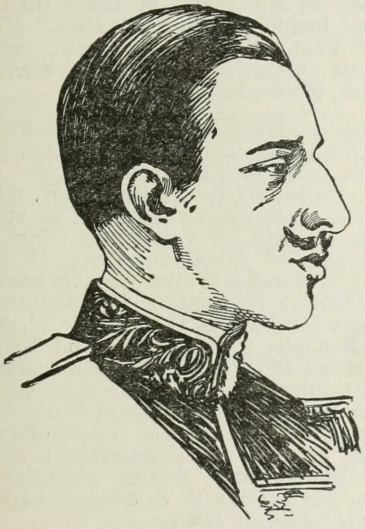
ALFONSO VI., King of Portugal, succeeded his father, John IV., in 1656, when but 13 years of age. For some years the government was in the hands of his mother, Louise de Guzman, a woman of great wisdom and prudence; but in 1662 the sickly and dissolute prince dismissed his mother from her office. In 1666 Alfonso married a princess of Savoy, but the Queen was soon disgusted with her unworthly husband, and conspired with his brother Pedro against him. He was forced to surrender to the latter his crown. He died (1683), a state prisoner at Cintra.

ALFONSO X., surnamed "the Astronomer," "the Philosopher," or "the Wise," King of Leon and Castile, born in 1226; succeeded his father, Ferdinand III., in 1252. Elected as their king by part of the German princes in 1257, he had to be content with the empty honor. He was successful in his wars with the Moors, and his victories over them enabled him to unite Murcia with Castile. In 1271 he was able to crush an insurrection headed by his son Philip; but a second and successful rising, under another son Sancho, in 1282, deprived him of his throne. Two years later, he died a fugitive at Seville. Alfonso was the founder of a Castilian national literature. He caused the first general history of Spain to be composed in the Castilian tongue by his historians. He completed the well-known code of laws, "Leyes de las Partidas," and he wrote several long poems, besides a work on chemistry, and another on philosophy. His improved planetary tables, still known as the "Alfonsine Tables," were completed in 1252. The "Opusculos Legales" of Alfonso were published by the Royal Academy of Madrid in 1836.

ALFONSO XII., King of Spain, the only son of Queen Isabella II. and her cousin, Francis of Assisi, was born Nov.

28, 1857. He left Spain with his mother when she was driven from the throne by the revolution of 1868, and till 1874 resided partly in France, partly in Austria. In 1874 Alfonso came forward himself as claimant to the Spanish throne, and in the end of the year was proclaimed by Gen. Martinez Campos as king. He was enthusiastically received, most of the Spaniards being by this time tired of the Republican Government, which had failed to put down the Carlist party. Alfonso was successful in bringing the Carlist struggle to an end in 1876, and after an uneventful reign died in 1885.

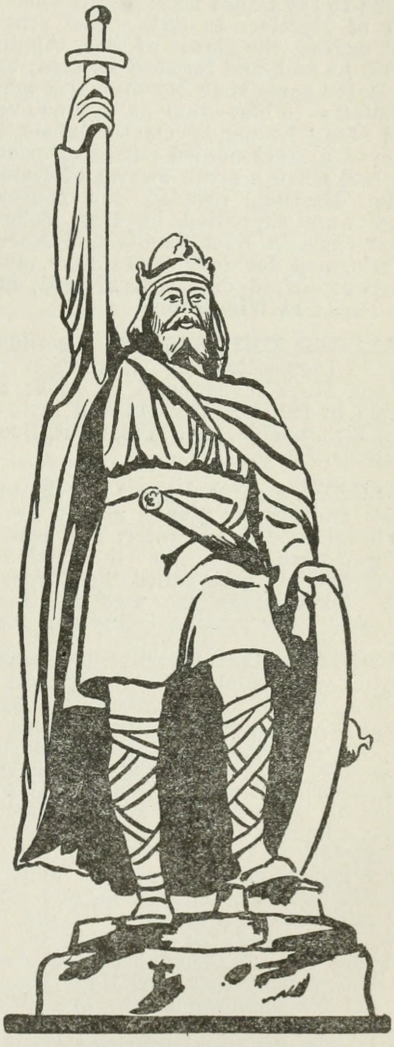
ALFONSO XIII., King of Spain, son of the late Alphonso XII. and Maria Christina, daughter of the late Karl Ferdinand, Archduke of Austria, born after his father's death, May 17, 1886.



ALFONSO XIII., KING OF SPAIN

His mother was made Queen Regent during his minority. In Spain the sovereign comes of age at 16, hence on May 17, 1902, the regency ceased and Alfonso XIII. assumed his full powers, after being crowned with the usual elaborate ceremonies. He was married to Princess Ena of Battenberg in 1906. An anarchist attempt was made to kill the royal pair on their wedding day. In the European War, King Alfonso favored the Allies, though, of course, adhering officially to his country's neutrality. He devoted his time and efforts to the improvement of the conditions of prisoners of war and of the civil population of war-stricken regions.

ALFRED THE GREAT, King of the West Saxons, was born at Wantage, Berkshire, in 849, and in 853 was taken to Rome. The fifth and youngest son of King Ethelwulf, he succeeded to the crown in 871, on the death of his brother Ethelred. By that time the Danes had overrun most of England N. of the Thames. The victory of Ashdown, won



ALFRED THE GREAT

chiefly by Alfred's bravery, just before his accession, gave only a temporary check to their incursions into Wessex; and in that same year the West Saxons fought eight other battles against them. In 878 Guthrum, King of the Danes of East Anglia, suddenly burst into Wessex. Alfred could make no effectual resistance, and, seeking refuge in the marshes

of Somerset, raised a fort at Athelney. In May he defeated the Danes at Edington, Wiltshire; and by the Peace of Wedmore, Guthrum had to receive baptism, and to acknowledge the supremacy of Alfred, who retained the country S. of the Thames and most of Mercia, while ceding to the Danes East Anglia and the rest of Mercia. In 884 Alfred sent a fleet against the Danes of East Anglia; in 886 he took and fortified London; and about the same time Northumbria made submission to him—thus he became overlord of all England. On the whole, he enjoyed a much-needed period of peace, till 893, when a fresh swarm of Danes, under Hasting, invaded the country. They were supported by their fellow-countrymen in East Anglia and Northumbria, and for four years gave much trouble. Alfred died Oct. 27, 901, and was buried at Winchester.

ALFRED UNIVERSITY, a coeducational (non-sectarian) institution in Alfred, N. Y.; organized in 1836; reported in 1919: Professors and instructors, 40; students, 400. President, Booth C. Davis, Ph. D.

ALGÆ, the general name for the seaweeds and similar plants, mostly growing in salt and fresh water. Vast masses of gulf-weed float in the Atlantic Ocean over an area called the Sargasso Sea. Some kinds are used for food, and others for making iodine and soda.

ALGEBRA, that department of mathematics which enables one, by the aid of certain symbols, to generalize, and, therefore, to abbreviate, the methods of solving questions relating to numbers. It is now regarded as the most extensive department of mathematics. It was called by Isaac Newton universal arithmetic, employing letters of the alphabet as symbols of known or unknown quantities and signs (+, —, $\sqrt{\ }$, etc.), to indicate addition, subtraction, and similar arithmetical processes. Of the letters, those near the beginning of the alphabet (a, b, c, d, etc.) usually stand for known quantities, and those toward its end for unknown ones. The difference between algebra and arithmetic consists in the universality of the former, its conclusions being true for any number of specific cases, while the results of an arithmetical process can be applied to a single case only. The earliest extant treatise on algebra is that of Diophantus (4th century A. D.). The Hindus transmitted the science to the Arabs, whose writings on the subject were brought to Italy by Leonardo Fibonacci (1202 A. D.) of Pisa.

ALGECIRAS, or ALGEZIRAS (al-he-thē-ras), a seaport on Gibraltar Bay, province of Cadiz, Spain; anciently known as Portus Albus. It was the first landing place of the Moors, who held it from 713 till 1344, when Alfonso XI. of Castile obtained possession of it after 20 months' siege. The city was entirely destroyed, remaining in ruins till 1760. In 1801 two engagements took place near Algeciras, between the English and the allied French and Spanish fleets. Here the important Morocco conference met in 1906. See MOROCCO.

ALGER, HORATIO, an American writer of juvenile books, born at Revere, Mass., Jan. 13, 1834; graduated from Harvard in 1852, settled in New York in 1866, and became interested in the condition of self-supporting boys, described in his series of more than 50 books, including "Ragged Dick," "Tattered Tom," "Luck and Pluck," which became very popular. He died in Natick, Mass., July 18, 1899.

ALGER, RUSSELL ALEXANDER, an American merchant, capitalist, and politician, born in Lafayette, O., Feb. 27, 1836. He served in the Civil War, rising from a captaincy to the rank of brevet Major-General of Volunteers. He was Governor of Michigan from 1885 to 1887; a candidate for the Republican presidential nomination in 1888; Commander-in-Chief of the Grand Army of the Republic (1889-1890); and became Secretary of War in President McKinley's Cabinet in 1897. Almost from the beginning of the Spanish-American War of 1898 he was the object of much public censure for shortcomings in his department, and finally resigned in 1899. He became U. S. Senator in 1902. He died Jan. 4, 1907.

ALGERIA, one of the Barbary states of north Africa, belonging to France, extending from 20° W. to 10° E. longitude. Area, 184,474 square miles. It is divided into the three departments of Oran, Constantine, and Algiers. It is regarded as part of France, but has a civil governor-general and a Council. The principal rivers—none of which are navigable—are the Shelif, Wadel-Kebir, and Seybus. There are several salt-water lakes, some of which are temporary; the largest of these is Shot Melrhirh, 100 feet below sea-level. In the district of the Tell Atlas, grain, sorghum, vegetables, and tobacco are produced; on the slopes the vine is cultivated, the wine being exported to France for re-export as French wine. The chief products of the country are wheat, barley,

oats, wine, oil, vegetables, tobacco, fruit, iron, lead, zinc, and other minerals. During the war considerable progress was made in the development of coal and lignite. The fisheries are important. The imports in 1919 amounted to £37,727,000, and the exports to £53,760,000. The principal imports were cotton, paper, coal, sugar, and coffee. The chief exports were wine, fruit, tobacco, oats, and barley. The customs receipts in 1919 amounted to about £1,300,000. There are about 2,500 miles of railway. The chief cities are Algiers, Oran, Constantine, and Bone. There are about 1,300 primary schools with about 4,000 teachers and about 150,000 pupils.

History.—The country, which was inhabited by Moors and Numidians, was conquered by Carthage, and after the fall of the latter came into the hands of Rome, under which it flourished until its conquest by the Vandals (450 A. D.). In the 7th century it was conquered by the Saracens. In 1516 the country was seized by Horuk Barbarossa, a renegade Greek corsair, who, as well as his successors (until 1710), recognized the suzerainty of Turkey. For three centuries the pirates of Algeria terrorized the Mediterranean. They became bolder in the 19th century, but were checked by Napoleon, and in 1815 were compelled by the United States squadron to sue for peace. In 1827, the French, after a three years' blockade of the ports, captured it. After the Franco-Prussian War there was a considerable immigration of Alsatians who preferred to remain under French rule.

The administration of the country is under a governor-general, assisted by a consultative council. The executive power is vested in the governor-general, who has charge of all services except that of the treasurer, justice, public instruction, and worship. The budget which is prepared by the governor-general is voted by the Financial Delegation and the Superior Council. The delegations represent the French colonists, the French taxpayers who are not colonists, and native Moslems. The Superior Council consists of elected members and the higher officials. The legislative power is vested in the French Parliament to which each department sends one senator and two deputies. Algerian troops fought bravely for France in the World War. Pop. about 5,600,000.

ALGIERS, city and capital of Algeria. It consists of a lower European town and an upper Moorish town. The first has a cathedral and an exchange. The latter contains several mosques and the Kasbah, the ancient fortress of the deys. The town is a favorite winter health resort. It has considerable trade; exports wine, wheat, coral, and olive oil. It was for a long time the chief rendezvous of the Algerian pirates; was bombarded by the British under Lord Exmouth, in 1816, and was taken by the French in 1830. Pop. about 200,000.

ALGIN, a jellylike substance found in marine algæ. It was discovered in 1881 by E. C. C. Stanford, of Glasgow. If the leaflike thalli of a laminaria are immersed in water containing a little carbonate of soda, the whole cellular fabric of the plant becomes broken up in the course of 24 hours, forming a thick gelatinous mass containing about 2 per cent. of algin. This mass, after being cautiously heated, is filtered through coarse linen. The properties of algin in the soluble form are those of a very viscous gum, drying up to a transparent elastic film. As a size or dressing for textile fabrics, algin goes further and does more work than starch or any of the ordinary gums, and has the advantage of being easily rendered insoluble in water. Algin makes an excellent thickening for soups, and, with the addition of a little gelatine or isinglass, is serviceable for jellies. The insoluble form of algin, in the dry state, resembles horn, and can be turned and polished. It is a by-product of the manufacture of iodine and is used in the preparation of photographic paper.

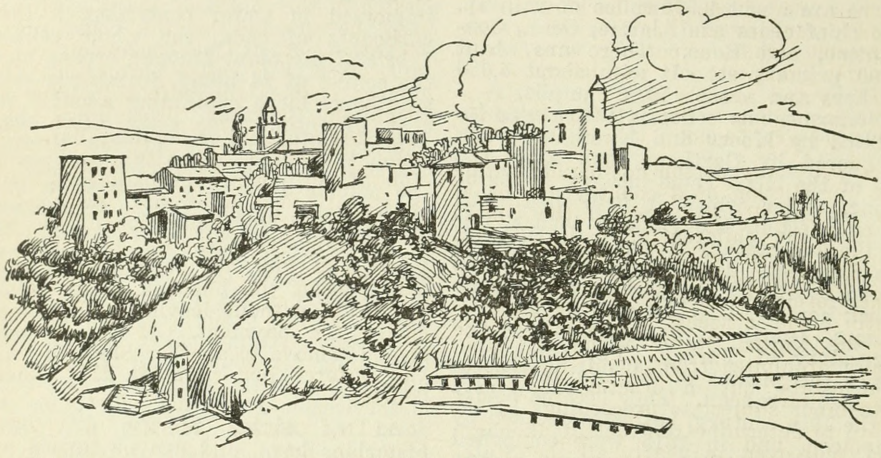
ALGOL, a fixed star in Medusa's head, in the constellation Perseus. Technically of 2½ magnitude, it really varies from the 2d to the 4th magnitude in 3½ hours, remaining thus for about 20 minutes. In 3½ hours more it is again of the 2d magnitude, at which it continues for 2 days and 13 hours, after which the same series of changes takes place again.

ALGONKIAN, or **ALGONQUIAN**, an Indian linguistic stock, originally the most extensive in North America. It extends southward from Labrador to Pamlico Sound, N. C., and westward from Newfoundland to the Rocky Mountains, comprising about 40 tribes, each with a separate language and numerous dialects.

Constant wars with the English, French, and Dutch colonists depleted their numbers. Filled at first with the idea of freeing the soil from the whites, they afterward degenerated into mere mercenaries, fighting on either side for revenge or gain. After the War of 1812, in which they took the side of the British, the United States Government resolved to send them as far W. as

possible. After 1840, few of them remained E. of the Mississippi. War and disease have thinned their number, until only 37,000 remain in the United States, and 63,000 in Canada. The chief occupations of the Algonkians were hunting, fishing and corn raising.

ALHAMBRA, the famous palace of the Moorish kings of Granada, situated on a hill N. of the town of Granada.



THE RED CASTLE, ALHAMBRA

It is inclosed in a walled area of 35 acres. The chief entrance to the inclosure is by a horseshoe arch, called the Gate of Judgment, 28 feet high, surmounted by a square tower. From this a narrow passage leads to the Plaza de los Algibes, where, on the left, is the ruined Alcazaba, the fortress of the Alhambra, and on the right is an unfinished palace of Charles V. Behind the latter is the Alhambra. Outside, the palace is cold and plain looking, but within, in the most ornate style of the East, are many halls, porticoes, courts, chambers, gardens, and mosaic pavements in red, blue, and yellow colors. The stone lacework is covered with inscriptions from the Koran and Arabic poetry. The Court of the Myrtles contains a large fish pond, and the famous Alhambra vase, discovered in the 16th century and dating from 1320. It is nearly 5 feet high, and is enameled in white, blue, and gold.

The Hall of the Ambassadors, the largest in the Alhambra, is contained within the tower of Comares, on the N. wall. The Court of the Lions is one of the most notable of the courts, having a length of 116 and a breadth of 66 feet. It is surrounded by a gallery supported by white marble pillars. Its pavements and walls are covered with colored tiles; and in its center is the Fountain of the Lions, an alabaster basin supported by 12 lions of white marble, out of whose mouths spouted the water from the basin. The Hall of the Abencerrages, the most beautiful one in the palace, is surrounded by an arcade with marble arches. This hall was the scene about 1480 of the massacre of the family of the Abencerrages, by King Boabdil. Opposite is the Hall of the Two Sisters, which takes its name from two large slabs of marble, each 15 feet long, which are embedded in the floor. The ceiling is made of about 5,000 stalactites, giving a curious and beautiful effect. The palace was begun by Ibn-el-Ahmar in 1248, and was completed by Mohammed III. in 1314. It was taken by the Spaniards in 1491, and was entered by Ferdinand and Isabella in 1492. It suffered at the hands of Charles V., and the French blew up several of its towers. The Alhambra is the most remarkable and most perfect specimen of Moorish art to be found in Europe.

ALHAMBRA, a city of California, in Los Angeles co. It is on the Southern Pacific and Santa Fé and the Pacific Electric Interurban railroads. It has several private schools and the San Gabriel Mission church, founded in 1771. The city is residential, but has some industries. Pop. (1910) 5,021; (1920) 9,096.

ALIAS, in law, a term used to indicate the various names under which a person who attempts to conceal his true name and pass under a fictitious one is ascertained to have passed during the successive stages of his career.

ALIBI, in law, a plea that the person accused of having committed a crime was elsewhere at the time when the breach of the law occurred. If he substantiate this, he is said to prove an alibi.

ALICANTE, a seaport of Spain; capital of the province of Alicante; the ancient Lucentum. It is situated at the foot of a cliff 850 feet high, which is crowned by the Fort of Santa Barbara. It has one of the best harbors on the Mediterranean, and carries on a considerable trade, exporting wine, fruit, esparto grass, etc. It was bombarded in 1873 by two vessels sent out by Cartagena insurgents. Pop. (1917), province, 502,607; city, 53,088.

ALIEN, any person not legally within the jurisdiction of a country as one of its citizens. By the laws of the United States, the children of male citizens, whether born within the country or abroad, are held to be citizens; but all other foreign born individuals are aliens until made citizens by naturalization. In the United States aliens are nominally prohibited from acquiring title to real estate, but in practice they may own lands subject to proceedings by the State to determine the fact of alienage; and, moreover, in nearly all the States there are special provisions removing such restrictions from resident aliens who are in the course of naturalization. The rights of aliens to hold personal property and carry on trade are the same as those of citizens. Naturalized aliens are permanently disqualified for election as President or Vice-President, and they cannot become members of the National Senate or House of Representatives until they have been citizens for nine or seven years respectively. In Great Britain there is no discrimination whatever between aliens and subjects as far as property rights are concerned. It is held by British law that the children of aliens born in Britain are natural born subjects. The U. S. Supreme Court in 1915 decided that a State had the right to prohibit alien labor in public and private works. In the European War of 1914-1918 the U. S. Government interned dangerous enemy aliens, and forbade trading with the enemy.

ALIEN PROPERTY CUSTODIAN. See UNITED STATES, Section UNITED STATES IN THE WORLD WAR.

ALIGHIERI. See DANTE.

ALIMENTARY CANAL, the alimentary tube; the great tube or duct by which food is conveyed into the stomach, and from which the waste and undigested food is excreted. It consists of the mouth, the pharynx (throat), the œsophagus (gullet), the stomach, the small intestine, the large intestine, and the rectum, and is about 25 feet long.

ALIMONY, in law, the allowance, awarded out of her husband's estate, to which a wife is entitled on separation or divorce. Jurisdiction in this matter in England is conferred upon a court of divorce. In the United States it is vested in the courts of equity. Alimony may be granted by the court during litigation, or at the conclusion of the suit, when it is called permanent. The former enables the wife to pursue the litigation, whether proceedings have been brought by or against her. The amount granted lies within the discretion of the court. Permanent alimony is a periodical allowance, awarded to the wife if the termination of the suit is favorable to her. By a writ of *ne exeat* (let him not depart), the court can prevent the husband from leaving the State without leaving sufficient security for payment. If the husband should remove to another State the wife can enforce her claim in the Federal courts.

ALIN, OSCAR JOSEF, a Swedish historian, born in 1846; professor in the University of Upsala. He instructed the Princess Victoria of Baden, afterward Crown Princess of Sweden, in Swedish history and literature. In 1888 he became a member of the Upper Chamber of the Parliament. He has written many monographs on the history of Sweden. Died Dec. 31, 1900, in Stockholm.

ALISON, SIR ARCHIBALD, a Scottish historian, born at Kenley, Shropshire, Dec. 29, 1792. He studied at the University of Edinburgh, and was admitted to the bar in 1814. His principal work, a "History of Europe," covering the period from 1789 to 1815, was translated into the leading languages of Europe. He died at Glasgow, May 23, 1867.

ALIZARIN, the coloring matter used in the dyeing of Turkey red, exists in the madder root as a glucoside, which, when boiled with acids or alkalies, gives glucose and alizarin. But in 1869 Græbe and Liebermann discovered a method of manufacturing it from the coal-tar product anthracene. The manufacture of alizarin is now one of the most important branches of the coal-tar coloring industry.

ALKAHEST, or ALCAHEST, the universal solvent of the alchemists. See ALCHEMY.

ALKALI, a strong base, capable of neutralizing acids, so that the salts formed are either completely neutral, or, if the acid is weak, give alkaline reactions. It was formerly restricted to the hydrates of potassium, sodium, lithium, and ammonium, but now includes the hydrates of alkaline earths (baryta, strontia, and lime) and many organic substances. The term alkali usually means, in commerce, caustic soda or potash, impure, NaHO or KHO; both are used in the arts for the manufacture of glass and soap, and for many other purposes. Caustic potash is used in surgery as a cautery.

ALKALIMETRY, the process of determining the purity of alkalies. Commercial potash and soda contain foreign substances, which diminish the percentage of real alkali. The alkalimeter furnishes a simple and ready means of determining the proportion of pure carbonate of potash or soda contained in any sample. It consists of a graduated glass tube, filled with diluted sulphuric acid, and containing as much absolute sulphuric acid as would neutralize a given weight, say 100 grains, of carbonate of potash. One hundred grains of the article to be judged of is then dissolved in water, and as much acid is gradually added to it from the tube as to neutralize the solution, that is, take up all the alkali. The point at which neutralization is complete is determined by means of colored tests. Formerly, the two vegetable colors, litmus and turmeric, were alone used for this purpose. It is not, however, always easy to recognize the neutral point, and other indicators (as these coloring matters are called) have come into use. The chief of these are methyl-orange and phenolphthalein. A mixture of the alcoholic solutions of these substances imparts a pale yellow color to strictly neutral liquids, which is changed to deep red by the least trace of alkali, and to pink by a trace of acid.

This method of determining the strength of alkalies is called the alkalimetric process.

ALKALOID, a substance resembling an alkali in properties. Alkaloids are natural organic bases containing nitrogen, and having high molecular weights. They occur in many plants, and some in animal tissues; they have not, except conine, been formed by synthesis. They are substitution compounds of ammonia; most are tertiary amines. They have mostly a bitter taste, act powerfully on the animal system, and are used in medicine as quinine, morphine, and strychnine; they are frequently violent poisons.

ALLAH (compounded of the article *al* and *ilâh*—*i. e.*, "the god," a word cognate with the Hebrew *Eloah*), the Arabic name of the supreme god among the heathen Arabs, adopted by Mohammed for the one true God. See MOHAMMED and MOHAMMEDANISM.

ALLAHABAD. (1) A division of British India; has an area of 17,264 square miles, is one of the most fertile and populous portions of India. (2) A district of the above division, lying around the junction of the Jumna and Ganges. Area 2,852 square miles. (3) The capital of the division of Allahabad; at the confluence of the Ganges and Jumna; seat of government of the Northwestern provinces; 72 miles W. of Benares. It carries on a large trade, especially in sugar, cotton, indigo, gold and silver ornaments, and furniture. It is a resort of Hindu pilgrims and the seat of an annual fair, usually attended by about 250,000 persons. Among the principal buildings are the fort founded by Akbar Khan in 1575, the Juma Masjid mosque, Sultan Khusru's caravansary, and the Muir Central College (1874). The town was taken by the British in 1765, and assigned by them to the titular Emperor of Delhi, but transferred to the Nawab of Oudh in 1771, who restored it to the British in 1801. It suffered severely during the mutiny of 1857. Pop. about 170,000.

ALLAN, DAVID, an eminent painter known as "the Scotch Hogarth," born in 1744. He studied art for 16 years in Rome, gaining a gold medal for historical composition in 1773. In 1777 he began to paint portraits in London. Among his most celebrated pictures are "The Origin of Portraiture" and the illustrations for Allan Ramsay's "Gentle Shepherd." He died in 1796.

ALLEGHENIES, a word used as synonymous with the APPALACHIAN MOUNTAINS (*q. v.*), sometimes applied only to that portion of the system which extends from Pennsylvania to North Carolina, and which forms the watershed between the Atlantic and the Mississippi. The ridges, 2,000 to 2,400 feet high, are remarkable for their parallelism and regularity, all the main valleys being longitudinal. They are rich in coal, iron, and limestone, and their forests supply valuable timber.

ALLEGHENY, a former city in Allegheny co., Pa., now consolidated with PITTSBURGH (*q. v.*).

ALLEGHENY COLLEGE, a coeducational (Methodist Episcopal) institution in Meadville, Pa.; organized in 1815; reported at the end of 1919: Professors, 26; students, 601; president, William H. Crawford, D. D.

ALLEGHENY RIVER, a river of Pennsylvania and New York; a headstream of the Ohio. It rises in Potter county, Pa., and joins the Monongahela at Pittsburgh. Among its tributaries are French creek, Clarion, and Conemaugh rivers. Its length is about 400 miles, and it is navigable for about 150 miles above Pittsburgh.

ALLEGORY, a figurative presentation of a subject, which carries with it another meaning besides the literal one. It is as often used in painting, sculpture, and other imitative arts as in language, although it is usually considered rhetorical. Like the fable and the parable, it has an underlying moral. It is metaphor extended to the minutest details, as in "Pilgrim's Progress."

ALLEN, CHARLES HERBERT, an American diplomatist, born in Lowell, Mass., April 15, 1848; was graduated at Amherst College in 1869; served in both branches of the State Legislature, and in Congress in 1885-1889; was defeated as the Republican candidate for governor of Massachusetts in 1891; and succeeded Theodore Roosevelt as Assistant Secretary of the Navy, in May, 1898. On the passage by Congress of the Porto Rico Tariff and Civil Government bill, in April, 1900, the President appointed him the first civil governor of the island. He became president of the American Sugar Refining Co. in 1913.

ALLEN, ELIZABETH AKERS, an American poet, born (ELIZABETH CHASE) at Strong, Me., Oct. 9, 1832. She was married in 1860 to Paul Akers, the sculptor, who died in 1861, and in 1865 to E. M. Allen, of New York. Her first volume, "Forest Buds," appeared under the pen name of "Florence Percy" (1855). Other works: "The Silver Bridge and Other Poems" (1866); a volume of "Poems" (1866), which contains "Rock Me to Sleep, Mother"; "The High Top Sweeting and Other Poems" (1891); "The Sunset Song" (1902).

ALLEN, ETHAN, an American Revolutionary hero, born at Litchfield, Conn., Jan. 10, 1737. His services in the War of Independence, as Colonel of the "Green Mountain Boys," capturing Fort Ticonderoga; his attack on Montreal; sufferings as a prisoner in England; skillful diplomacy in behalf of Vermont, etc., are well known. He wrote an account of his captivity (1779), "A Vindication of Vermont" (1784), and "Allen's Theology, or the Oracles of Reason" (1784), in which he declared reason to be the only oracle of man. He died near Burlington, Vt., Feb. 12, 1789.

ALLEN, GRANT (CHARLES GRANT BLAIRFINDIE ALLEN), an English naturalist, essayist, and novelist, born in Kingston, Canada, Feb. 24, 1848. He graduated from Oxford, and was professor at Queen's College, Jamaica. He became a follower of Charles Darwin and Herbert Spencer, and was author of scientific essays in a light, attractive style. After 1883 he produced a large number of novels. Among them are "Babylon" (1885); "The Devil's Die" (1888); "Under Sealed Orders" (1896). He died Oct. 25, 1899.

ALLEN, HENRY J., an American statesman, born in Warren co., Pa., in 1868. He was educated at Baker University and Washington College. In 1894 he began newspaper work and soon became owner of several daily newspapers in Kansas, the most important of these being the Wichita "Daily Beacon." He was president of the Kansas State Board of Charities for five years. During the World War he went to France under the auspices of the Red Cross and during his absence was nominated and elected Governor of Kansas. His prompt action during the coal-mining strike in the winter of 1919 attracted attention throughout the country. In response to his call volunteers from all classes undertook to man the mines abandoned by the miners. Following this there was passed a measure providing for an industrial court for the prevention of strikes. He was mentioned as a candidate for the Republican nomination for the presidency in 1920. In the same year he was re-elected Governor.

ALLEN, JAMES LANE, an American novelist, born near Lexington, Ky., in 1850. He graduated at Transylvania University, taught there for a time, and became subsequently Professor of Latin and English in Bethany College. His fame rests mainly upon his powerful and popular novels of manners and people in the "blue grass" region and elsewhere, the best known being "Summer in Arcady" (1896); "The Choir Invisible" (1897); "A Kentucky Cardinal"; "Aftermath"; "The Cathedral Singer" (1916); "The Kentucky Warbler" (1917); "The Emblem of Fidelity" (1918).

ALLEN, VIOLA, an American actress. She was educated in New York and at the age of 15 began her stage career. She became one of the most prominent players on the American stage, appearing in Shakespearean rôles and in many of the most successful modern plays. In 1906 she married Peter Duryea.

ALLEN, WILLIAM HENRY, an American educator, born March 27, 1808; educated at Bowdoin College; served several colleges as Professor of Latin, Greek, Chemistry, Natural Philosophy, and English Literature; President of Girard College, Philadelphia (1850-1862 and 1867-1882); and President of the American Bible Society from 1872 till his death, Aug. 29, 1882.

ALLENBY, LORD EDMUND, 1st Viscount, a British commander, born April 23, 1861; chose army as profession and served in the campaigns in Bech-



FIELD-MARSHAL LORD EDMUND ALLENBY

uanaland, 1884-1885; Zululand, 1888; South African War, 1899-1902. At the outbreak of the World War, commanded the cavalry of the expeditionary forces. He did brilliant work on the western front, and later was given the chief command of the Palestinian forces. As the outcome of a vigorous campaign, Jerusalem was captured Dec. 10, 1917. After a rest and refitting of his army, he inaugurated a campaign of dazzling brilliancy on Sept. 19, 1918. Within two days he captured 80,000 prisoners and 500 guns, and put to rout three Turkish armies. On Oct. 1 Damascus fell, Beirut was captured on the 8th, and on October 26 the British armies entered Aleppo. The Turkish power was utterly crushed, and shortly afterward made overtures for an armistice. In the following year Allenby was sent to Egypt to take charge of the military forces then engaged in suppressing the Egyptian Nationalist uprising. In this he was successful. On his return to England he was rendered an ovation and promoted to the rank of Field-Marshal in recognition of his distinguished services.

ALLENSTEIN (al'en-stīn), a city in the district of Allenstein, province of East Prussia, on the river Alle; founded in 1353; has iron foundries, machine works, match factory, breweries, trade and agricultural schools, cattle, and horse markets, and an insane asylum; trade in linen, hops, and wood. On Feb. 4, 1807, Soult defeated the rear guard of the Russian and Prussian army near the bridge over the Alle, between Allenstein and Gutstadt. Pop. about 35,000. The city was the center of important military operations. It was captured in the Russian advance in August, 1914, but was soon retaken by the Germans. Near by occurred the famous battle of Tannenberg, in the last week of August, 1914. See WORLD WAR.

ALLENTOWN, city and county-seat of Lehigh co., Pa.; on the Lehigh river and canal and several railroads; 60 miles N. of Philadelphia. It is built on high ground and is surrounded by a beautiful and fertile country. The city is noted for its manufactories, which include blast furnaces, iron and steel rolling mills, wire works, hosiery and thread factories, silk works, and furniture and shoe factories. Allentown is the seat of Muhlenberg College (Lutheran). It has gas and electric light plants, several National banks, and daily, weekly, and monthly periodicals. Pop. (1910) 51,913; (1920) 73,502.

ALL-HALLOWS' EVE, the 31st of October, the evening before All-Hallows. Till recently it was kept up (especially in Scotland) with ceremonies which have apparently come down from druidical times. Though connected with All-Saints' Day (1st of November), yet it seems to have been formerly a merry making to celebrate the end of autumn, and help to fortify the mind against the advent of winter.

ALLIANCE, a city in Stark co., O.; on the Mahoning river and the Alliance and Northern and the Pennsylvania Co.'s railroads; 56 miles S. E. of Cleveland. It is in an agricultural region; is the seat of Mount Union College

(Methodist Episcopal); and has a National bank, manufactories of drop forgings, steam hammers, boilers, white lead, terra cotta ware, and agricultural implements, and daily, weekly, and monthly periodicals. Pop. (1900) 8,974; (1920) 21,603.

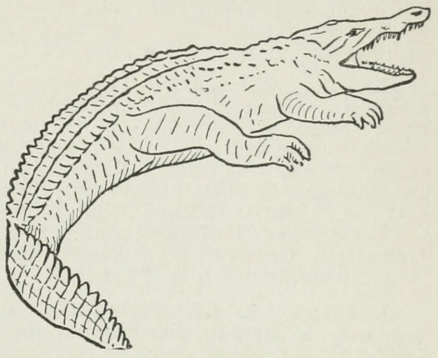
ALLIANCE FRANÇAISE, FÉDÉRATION DE L', an association of societies organized in the United States and Canada in 1902. Its purpose is to promote the study of the French language, literature, arts, and history. A council composed of twenty directors meets five times yearly to supervise the affairs of the Federation. There are in the United States and Canada over 50 groups or circles which send delegates to the annual convention held in various cities.

ALLIANCE ISRAÉLITE UNIVERSELLE, an organization established in 1860 in Paris for the general benefit of the Jews throughout the world. Its original program included the emancipation of the Jews under oppressive laws and political disabilities. The movement spread until it became a great power. Schools were established in various parts of Europe and Asia. Farm schools were also established in Palestine. Normal schools for teachers are maintained in Paris. There are committees of the Alliance in New York and Philadelphia. It publishes monthly bulletins and semi-annual reports, together with reports on special studies on subjects related to its work.

ALLIBONE, SAMUEL AUSTIN, an American bibliographer, born at Philadelphia, April 17, 1816. He was at one time librarian of the Lenox Library, New York. He was the author of a "Dictionary of English Literature, and British and American Authors"; "Poetical Quotations," "Prose Quotations," etc. It took 20 years to write the Dictionary. He died at Lucerne, Switzerland, Sept. 2, 1889.

ALLIGATOR, a genus of reptiles belonging to the family *alligatoridæ* and order *crocodilia*. The alligator is known from its nearest allies, the crocodiles and gavials, by having the head depressed and the canine teeth of the lower jaw received in a pit in the upper. The hind feet are never completely webbed, and sometimes there is scarcely any membrane. The best known species is *alligatoridæ mississippiensis*, the alligator of the Mississippi river. It is 15 or 18 feet, or even more, in length.

ALLINGHAM, WILLIAM, an Irish poet, born at Ballyshannon, March 19, 1828. Having for some years been an officer in the customs, he became assistant editor of "Fraser's Magazine," in 1872, and succeeded Froude as editor in 1874, when he also married Helen Pater-



ALLIGATOR

son, the illustrator and water color artist. Prominent among his works is "Lawrence Bloomfield in Ireland" (1864), a narrative poem on contemporary Irish life. He died near London, Nov. 18, 1889.

ALLISON, WILLIAM BOYD, an American legislator, born in Perry, O., March 2, 1829; was brought up on a farm; and subsequently educated at Allegheny College, Pa., and Western Reserve College, O. He practiced law and in the early part of the Civil War served on the governor's staff. In 1863-1871 he was a representative in Congress; and on March 4, 1873, entered the United States Senate as a Republican, to which he was re-elected in 1878, 1884, 1890, and 1896. He was a delegate to the Republican National Convention in Chicago, in 1860. In the session of the Senate, beginning Dec. 4, 1899, he was Chairman of the Committee on Appropriations and a member of that on Finance. He died Aug. 4, 1908.

ALLITERATION, the succession or frequent occurrence of words beginning with the same letter. In the older Scandinavian, German, and Anglo-Saxon poetry it served instead of rhyme. It is found in early English poetry with the same function.

ALLOBROGES, in ancient history, a warlike people of Gaul, who inhabited the territory between the Rhone and the Isère, extending to Lake Geneva. They appear in the annals of Hannibal's expedition to Gaul (218 B. C.).

ALLODIUM, or **ALLODIAL TENURE**, the absolute ownership of landed property unburdened by any rent or service due

a superior. In most European countries where feudal tenure arose, it grew up by individual surrender of allodial tenure; consequently allodial tenure continued in some measure to exist along with the other. In the United States and in the British colonies the land tenure is allodial.

ALLOPATHY, a system of medicine—that ordinarily practiced—the object of which is to produce in the bodily frame another condition of things than that in or from which the disease has originated. If this can be done the disease, it is inferred, will cease. Allopathy is opposed to homœopathy, which aims at curing diseases by producing in antagonism to them symptoms similar to those which they produce; the homœopathic doctrine being that "like is cured by like."

ALLOPHYLIAN, in ethnology, a term introduced by Pritchard to characterize the nations or races of Europe and Asia not belonging to the Indo-European, the Syro-Arabian, or the Egyptian races. It has been generally superseded by Turanian.

ALLOWAY, Burns' birthplace, and the scene of his "Tam o' Shanter," lies on the right bank of the "bonny Doon" 2 miles S. of the town of Ayr. The "auld clay biggin," in which the poet was born on Jan. 25, 1759, was in 1880 converted into a Burns Museum. The "haunted kirk" still stands, a roofless ruin, near the "auld brig"; and close by is the Burns monument (1820).

ALLOY, a compound or mixture of two or more metals. When mercury is mixed with another metal, the compound is termed an amalgam. Alloys are divided into three groups: (1) Those formed by the metals lead, tin, zinc, and cadmium, which impart to their alloys their own physical properties in the proportions in which they themselves are contained in the alloy. (2) Those formed by almost all other metals. (3) Those which contain metals found in both these groups of alloys.

In every alloy the specific heat and the coefficient of expansion are always the means of those of its component metals. But in other physical properties a variation takes place. This is the case with specific gravity, which, in alloys of the first group, is the mean of their constituent metals; but in those of the second group it is always greater or less than the mean specific gravity of their constituents.

In some instances, when two melted metals are mixed together to form an alloy, an evolution of heat occurs which is believed to indicate that a chemical compound has been formed. This is the case with copper and zinc, copper and aluminum, platinum and tin, etc. The strength or cohesion of an alloy is generally greater than that of the mean cohesion of the metals contained therein or even of that of the most cohesive of its constituents.

The most useful alloy in the arts is brass. This compound metal is next to iron in importance.

There are some important alloys of copper and tin, among them bronze, gun metal, bell metal and speculum metal. In these the proportions vary from equal parts of copper and tin to 10 parts of copper with 1 of tin. The most cohesive, that is, the strongest of them, is a bronze consisting of 6 parts of copper to 1 of tin. Phosphor bronze is an invention of recent years. The addition of from 0.25 to 2.5 per cent. of phosphorus to a bronze containing from 7 to 8 per cent. of tin gives it greater hardness, elasticity, and toughness. This alloy is now much used for parts of machinery.

Pewter is a tin alloy which was more used formerly than now. Type metal is a compound of 50 parts of lead, 25 of antimony, and 25 of tin, but it varies slightly. Fusible metal melts at low temperatures; one kind is composed of 3 parts of tin, 5 of lead, and 8 of bismuth, and melts in hot water. This alloy is now a good deal employed in stereotyping, and in obtaining copies of woodcuts.

Aluminum bronze, very closely resembling gold in appearance, is much used for pencil-cases, chains, and some larger objects. A compound of silver and aluminum is sometimes used for watch-springs, and for spoons and forks. Dentists use a very ductile alloy composed of 2 parts by weight of silver and 1 of platinum.

When gold is to be used for coins, jewelry, or plate, it requires to be alloyed with copper or silver or with both, in order to harden it. Like silver, it is too soft when pure. There are five legal standards for articles made of gold—*i. e.*, alloyed gold apart from coin. These are called 22, 18, 15, 12, and 9 carat gold. That is to say, these figures represent the number of parts of pure gold in every 24 parts of the alloy used by the goldsmith or jeweler. English sovereigns are made of a mixture of 22 parts of gold to 2 of copper, and this is called 22-carat or standard gold. In Germany, Italy, and the United States, standard gold for the coinage is 21.6 carats.

In the United States, it is declared by law that the standard for both gold and silver coins shall be such, that of 1,000 parts, by weight, 900 shall be of pure metal and 100 of alloy.

ALL-SAINTS' BAY, in the state of Bahia, coast of Brazil, forms a natural harbor, in which the navies of the whole world might ride at anchor. Its length from N. to S. is 35 miles; its breadth 27. The town of Bahia lies just within it.

ALL-SAINTS' DAY, a festival instituted by Pope Boniface IV., early in the 7th century, on the occasion of his transforming the Roman heathen Pantheon into a Christian temple or church, and consecrating it to the Virgin Mary and all the martyrs. It is kept by the Churches of England, Rome, etc., on the 1st of November and is designed to honor all saints. It was formerly called All-hallows. In many American Churches a custom has grown up of making the Sunday nearest the 1st of November the occasion of a service in memory of those who have died during the year.

ALL SOULS COLLEGE, one of the colleges of the University of Oxford, England, founded by Archbishop Chichele in 1437. The college is especially notable for the number of eminent theologians who have been graduates. Among them are Jeremy Taylor and Reginald Heber. Many eminent lawyers and statesmen have also been members of this college. These include Gladstone, Blackstone, Lord Salisbury, and Earl Curzon. The Codrington Library belonging to the college contains over 70,000 volumes.

ALL-SOULS' DAY, the day on which the Church of Rome commemorates all the faithful deceased. It was first enjoined in the 11th century by Odilon, Abbot of Cluny, on his monastic order, and soon afterward came to be adopted by the Church generally. It is held on the 2d of November.

ALLSPICE, a kind of pepper, consisting of the dried berries of pimenta officinalis (*myrtus pimenta* of Linnæus, *eugenia pimenta* of De Candolle), a tree belonging to the order *myrtaceæ* (myrtle blooms). It is imported almost entirely from Jamaica, and is hence called Jamaica pepper. It is termed also pimento, from Spanish *pimienta*=pepper; its berries in shape and flavor resembling peppercorns. The trees are cultivated in Jamaica in plantations called pimento walks. Their unripe fruits, and, to a lesser extent, all parts of them, abound in an essential oil, which has the same composition as oil of cloves; of this the berries yield from 3 to 5 per cent. It is a powerful irritant, and is often used to allay toothache. The allspice imported into this country is derived from pimenta officinalis, and not from pimenta acris.

The word is also the English name of the genus *calycanthus*, and especially of *C. floridus*, which has a scent like the pimento tree, grows in Carolina, and is often called the Carolina allspice. Japan allspice is the English name of the genus *chimonanthus*, which belongs to the *calycanthaceæ;* wild allspice is benzoin odoriferum, a species of the laurel order.

ALLSTON, WASHINGTON, an eminent American painter, poet, and romancer, born at Waccamaw, S. C., Nov. 5, 1779; graduated at Harvard in 1800; studied at the Royal Academy, London, and in Rome, and returned to Boston in 1809. He is the author of "The Sylph of the Seasons, and Other Poems" (1813); "Monaldi," a romance (1841), and "Lectures on Art and Poems" (1850). He died in Cambridge, Mass., July 9, 1843.

ALLUVIUM, the act or process of washing away soil, gravel, rocks, etc., and depositing the débris in other places; also, the materials thus deposited.

In geology the form of the word is alluvium, or, rarely, alluvion.

Alluvium is especially employed to designate the transported matter laid down by fresh water during the Pleistocene and recent periods. The most typical example of alluvium may be seen in the deltas of the Nile, Ganges, Mississippi, and many other rivers. Some rivers have alluviums of different ages on the slopes down into their valleys. The more modern of these belong to the recent period, as do the organic and other remains which they contain, while the older (as those of the Somme, Thames, Ouse, etc.), which are of the Pleistocene age, inclose more or less rudely chipped flint implements, with the remains of mammals either locally or everywhere extinct.

Volcanic alluvium is sand, ashes, etc., which, after being emitted from a volcano, come under the action of water, and are by it redeposited, as was the case with the materials which entered and filled the interior of houses of Pompeii.

Marine alluvium is alluvium produced by inundations of the sea, such as those which have from time to time overflowed the eastern coast of India.

In English law, the form of the word

generally used is alluvion, and in Scotch law alluvio. In both of these the enactment is, that if an "eyott," or little island, arise in a river midway between the two banks, it belongs in common to the proprietors on the opposite banks; but if it arise nearer one side, then it belongs to the proprietor whose land it there adjoins.

ALMA, a city of Michigan in Gratiot co. It is 90 miles N. E. of Grand Rapids, and is on the Père Marquette and Ann Arbor railroads, and on the Pine river. It has important manufactures of automobiles, gas engines, furnaces, flour, and lumber products. It is the center of a fertile agricultural region. It produces large quantities of beet sugar. The city is the seat of ALMA COLLEGE (*q. v.*) and has excellent schools and a Masonic Home. Pop. (1910) 2,757; (1920) 7,542.

ALMA, a river in the Crimea, rising at the foot of the Tchadir Dagh, and flowing westward into the Bay of Kalamita, about halfway between Eupatoria and Sebastopol. On the steep banks of the stream, through the channel of which the British troops waded amid a shower of bullets, a brilliant victory was won on Sept. 20, 1854, by the allied armies of England and France, under Lord Raglan and Marshal St. Arnaud, over the Russian army commanded by Prince Menschikoff. It was the first battle of the Crimean War.

ALMA COLLEGE, a coeducational institution in Alma, Mich., organized under the auspices of the Presbyterian Church; reported in 1919: Professors and instructors, 22; students, 200; president, H. M. Crooks, LL. D.

ALMADEN (al-mä-dān′), a town in Spain, 50 miles S. W. of Ciudad Real, situated in the chain of the Sierra Morena. Pop. about 9,000. It is famous for its rich quicksilver mines, dating from the 17th century, but worked by the Romans. Crown property, they were rented by the Fuggers of Augsburg (1525-1645), and by the firm of Rothschild (1836-1863), but are now again carried on by the government.

ALMAGRO, DIEGO D' (al-mä-grō), a Spanish conquistador, born in 1464 or 1475, a foundling who derived his name from the town near which he was found. After serving in the army, he sailed for the New World, where he amassed considerable wealth by plunder, and became one of the leading members of the young colony of Darien. In 1522 he formed, with Pizarro, the design of conquering Peru—an undertaking crowned 10 years afterward with success. Receiving permission from the Spanish court to conquer for himself a special province, he marched on Chile in 1536, penetrated as far as the Coquimbo, and returned in 1537, just when the Peruvians had flown to arms and shut up the Spaniards in Cuzco and Lima. As these towns lay S. of Pizarro's district, they were claimed by Almagro. He dispersed the Peruvian army before Cuzco, and advanced against Lima. But on April 6, 1538, he was defeated in a desperate engagement with the Spaniards under Pizarro near Cuzco; and on the 26th he was strangled in prison. His half-caste son, Diego, collecting some hundreds of his father's followers, stormed Pizarro's palace, and slew him (1541); then proclaimed himself captain-general of Peru; but, defeated in a bloody battle of Chupas, Sept. 16, 1542, he was executed along with 40 of his companions.

ALMANAC, an annual compilation, based on the calendar, embracing information pertinent to the various days of the year, the seasons, etc., with astronomical calculations and miscellaneous intelligence. Before the invention of printing there was no satisfactory method of distributing to the public systematically arranged information about the calendar for the year and the forthcoming astronomical phenomena; but different ingenious devices were employed by the people. One of the most celebrated of these was the so-called clog almanac, a four-sided stick of wood, upon which the Sundays and other fixed days were notched, and the characters were inscribed to distinguish them.

The oldest printed almanac is attributed to George von Purbach, of Vienna, in the middle of the 15th century, and entitled "Pro Annis Pluribus." King Matthias Corvinus employed Johann Regiomontanus, in 1474, to compile an almanac, which was printed in Latin and in German. Almanacs were issued by a printer named Engel beginning with the year 1491. Stöfler, Tübingen, published almanacs at irregular intervals. Yearly almanacs were printed somewhere in the course of the 16th century. In the 17th century all sorts of astrological and meteorological information and other kinds of news were published in the almanacs and took the place, in a measure, of the newspaper of to-day. The "Almanach Royal," which began to be published in 1679 in Paris, contained notices in regard to posts, court festivals, masses, markets, etc. In 1699 the genealogy of the royal house and enumeration of the higher clergy were added. This form of almanac was imitated in Prussia in 1700, in Saxony in 1728, and, under the title of

"Royal Almanac," in England in 1730. Shortly afterward almanacs prepared for the people began to appear, containing, instead of official information, short stories, anecdotes, poems, and all sorts of information.

In England, King James I. gave the monopoly of almanac printing to the Universities and the Stationers' Company, but the former were no more than sleeping partners in the concern.

The first American almanac was that of William Pierce, of Cambridge, published in 1639. The most famous of American almanacs was "Poor Richard's," published in Philadelphia by Benjamin Franklin under the pseudonym of Richard Saunders.

Some of the almanacs that are regularly published every year are extremely useful, and are indeed almost indispensable to men engaged in official, mercantile, literary, or professional business. Such in Great Britain are Thom's "Official Directory of the United Kingdom," the "British Almanac" with its "Companion," Oliver & Boyd's "Edinburgh Almanac," and Whitaker's "Almanac." In the United States "The American Almanac" appeared between 1830-1861, and a second publication under the same name was edited for several years by Ainsworth R. Spofford. Several of the largest newspapers in the United States now issue almanacs which are marvels of condensed information.

The "Almanach de Gotha," which has appeared at Gotha since 1764, contains in small bulk a wonderful quantity of information regarding the reigning families and governments, the finances, commerce, populations, etc., of the different states throughout the world. It is published both in a French and in a German edition. "The Nautical Almanac" is an important work published annually by the British Government, two or three years in advance, in which is contained much useful astronomical matter. This almanac was commenced in 1767 by Dr. Nevil Maskelyne, astronomer royal. The French "Connaissance des Temps" is published with the same views as the English "Nautical Almanac," and nearly on the same plan. It commenced in 1679. Of a similar character is the "Astronomisches Jahrbuch," published at Berlin. The "American Ephemeris and Nautical Almanac" is issued annually since 1855 by the Bureau of Navigation of the United States.

ALMANSUR ("the Victorious"), the title assumed by Abu-Jafar, the second caliph of the house of the Abbassides, who succeeded his brother in 754. Warfare, treachery, murder were his steps to the throne, and his whole rule was as cruel as its beginning. He especially persecuted the Christians in Syria and Egypt. In war against external foes he had but little success, Spain and Africa falling away from the Eastern caliphate. The best feature in his character was his patronage of learning. He caused the "Elements" of Euclid to be translated from the Syriac, and the famous fables of Bidpai from the Persian. Almansur died in 1775 during a pilgrimage to Mecca, at the age of almost 70.

ALMA-TADEMA, LAURENCE, a distinguished figure painter, born in Friesland, Jan. 8, 1836; elected to the Royal Academy, London, in 1879; officer of the Legion of Honor, 1878; and member of the leading academies of Europe; studio in London. His paintings show a fondness for Greek and Roman subjects, and have won many honors for him. Among the best known are "Roman Dance," "Bacchante," "In the Terpidarium," "Antony and Cleopatra," and "An Audience at Agrippa's." He died in 1912.

ALMA-TADEMA, LAURENCE (Miss), an English writer, the daughter of Sir Laurence Alma-Tadema, Her popular writings include "Love's Martyr," "The Wings of Icarus," "The Fate of Spinner," "Tales from Our Garden." She made a reading tour of the United States in 1907-1908.

ALMEIDA (al-mā'ē-da), one of the strongest fortified places in Portugal, is situated on the river Coa, on the Spanish frontier, in the province of Beira. In 1762 it was captured by the Spaniards, but soon restored. In 1810 it was defended against Marshal Massena by an English officer until the explosion of a powder magazine compelled him to capitulate. Pop. about 2,500.

ALMEIDA-GARRETT, JOÃO BAPTISTA DE SILVA LEITÃO DE, a distinguished Portuguese poet, dramatist, and politician, born in Oporto, Feb. 4, 1799; studied law at Coimbra, and, joining the democratic movement in 1820, became Minister of Public Instruction when scarcely 21, but, on the restoration in 1823, was banished and went to England. He subsequently returned, and experienced many vicissitudes owing to his political activity. As a man of letters he endeavored to free Portuguese poetry from the shackles of pseudo-classicism, and to create a national form. His principal works are "Catão," a tragedy (1820), among the best in Portuguese literature; "Camões" (1825); "Dona Branca" (1826); "Adozinda" (1828); "Bernal Francez" (1829); "Auto de Gil

Vicente" (1838); "O Arco de Sant' Anna" (1846); "Romancerio" (3 vols., 1851-1853). He died in Lisbon, Dec. 10. 1854.

ALMERIA (al-mā-rē'a), a fortified seaport of southern Spain, capital of the province of Almeria, near the mouth of a river and on the gulf of the same name, with no buildings of consequence except a Gothic cathedral, but with an important trade, exporting lead, esparto, barilla, etc. The province, which has an area of 3,300 square miles, is generally mountainous. Pop. (1917), province, 393,680; town, 48,614.

ALMOND, the fruit of the almond tree. It is a slight ovate drupe, externally downy. There are two varieties of it, the one sweet and the other bitter. Sweet almonds are eaten. Bitter almonds contain prussic acid, and, eaten in large quantities, are poisonous.

Also, the tree on which the fruit described grows, the *amygdalus communis*, of which there are two varieties, the *amygdalus communis*, simply so termed, and the *amygdalus communa*, variety *amara*, or bitter almond. The former has pink and the latter white flowers. Both varieties are found in the south of Europe, the sweet one being the more common. They seem to have come originally from Persia, Asia Minor, Syria, and the north of Africa.

In anatomy, the almonds of the throat, or tonsils, are two round glands placed at the base of the tongue on either side.

ALMOND-OIL, BITTER ALMOND-OIL, or **BENZOIC ALDEHYDE**, in chemistry, an oil obtained by pressing almonds. The oil of bitter almonds, at least when impure, is very poisonous. It has, however, been used as a cure in intermittent fever.

ALMONTE, JUAN NEPOMUCENO (al-môn'tė), a Mexican general, born in 1804. As a boy he took part in the war for independence. In 1824, he went to London as attaché to the Mexican embassy, and, after his return, became a member of Congress. In 1832 he was appointed chargé d'affaires at London, then in Peru. He entered the army and served under Santa Anna in Texas in 1836. After that he became Minister of War under Bustamente, and, in 1841, was sent to Washington. In 1845 he became Minister of War, and was a second time sent as minister to the United States, soon afterward. He took part in the battles of Buena Vista and Cerro Gordo in 1847. In 1853 he was again sent to Washington, and, in 1857, to Paris. In 1861, when Juarez attained power, he deposed Almonte, who, led by ambition, invited the French expedition to Mexico. In 1862 he joined the French troops of occupation at Vera Cruz; but, as the Mexicans saw in him only a tool of the French plans, they renounced the idea of making him French dictator. The French general, himself, deprived him of power, but when, on the 10th of June, 1863, he reached the City of Mexico with the French, he was placed by the conquerors at the head of the Regency of the Mexican Empire. The Emperor Maximilian appointed him field-marshal, but, after Maximilian's death, he fled to Europe, and died in Paris, March 22, 1869.

ALMS, pity, mercy; charity, from *eleeo*, to have pity; *eleos*, pity. Thus, alms in English, when traced to its origin, is really the Greek word *eleemosyne* corrupted.

In ordinary language, money, food, clothing, or anything else given as a gratuity to relieve the poor.

In law, reasonable alms are a certain portion of the estates of intestate persons allotted to the poor.

A tenure by free alms, or frank almoyne, is a tenure of property which is liable to no rent or service. The term is especially applied to lands or other property left to churches or religious houses on condition of praying for the soul of the donor. In the United States, churches, schools and charitable institutions are free from taxation.

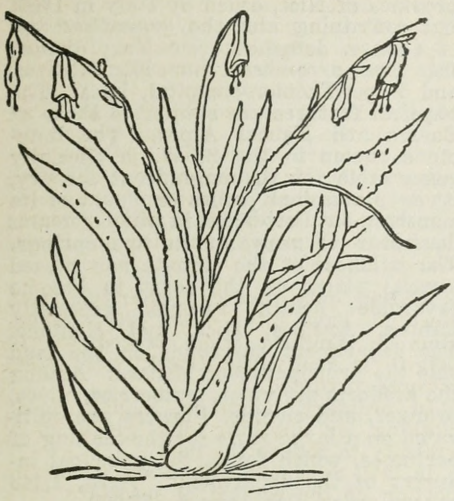
ALMUCANTAR, ALMUCANTER, ALMACANTER, or **ALMOCANTAR**, a circle drawn parallel to the horizon; generally used in the plural for a series of parallel circles drawn through the several degrees of the meridian. They are the same as what are now called parallels of altitude.

ALNUS, a genus of plants belonging to the order *betulaceæ* (birch-worts). The flowers are monœceous and amentaceous. In the barren ones the scale of the catkin is three-lobed, with three flowers; the perianth is four partite; the stamina, four. In those which are fertile the scale of the catkin is subtrifid with three flowers, and there is no perianth. The ovary is two-celled, two-ovuled, but only one ovule reaches perfection.

ALOE, any species of the genus described under botany (below), or even of one, such as agave, with a close analogy to it. The American aloe is the agave americana, an amaryllid.

In botany, a genus of plants belonging to the order *liliaceæ*, or lily-worts, and constituting the typical genus of the sec-

tion called *aloinæ*. The species are succulent herbs, shrubs, or even trees, with erect spikes or clusters of flowers. They



ALOE

are used in the West Indies for hedges; the juice is purgative, and the fibers are made into cordage or coarse cloth.

ALOES, the inspissated juice of the aloe. There are four principal kinds, two officinal. (1) Barbadoes aloes (*aloe barbadensis*), formed from the juice of the cut-leaf of *aloe vulgaris*. It is imported in gourds, and has a dull yellowish brown, opaque color, breaks with a dull conchoidal fracture, shows crystals under the microscope, has a nauseous odor, and is soluble in proof spirit. (2) Socotrine aloes (*aloe socotrina*), the produce of several species of aloes; it occurs in reddish brown masses, and breaks with a vitreous fracture. Its powder is a bright orange color. It has a fruity smell. It comes from Bombay. (3) Hepatic aloes, or East India aloes, non-officinal, is liver colored; its powder is yellow. (4) Cape aloes, the produce of *aloe spicata* and other non-officinal species, is a greenish brown color; this is given to horses. An inferior variety is called caballine aloes. Aloes acts as a purgative.

ALOES WOOD (sometimes called also eagle wood, calambac, paradise wood, or agallochum), the heart wood of *aquilaria ovata* and *aloes agallochum*, trees of the order *aquilariaceæ*, natives of the tropical parts of Asia, and supposed to be the aloes of lign-aloes of the Bible. They are large, spreading trees. Aloes wood contains a dark-colored, fragrant, resinous substance, and is much prized in the East as a medicine, and for the pleasant odor which it diffuses in burning. A similar substance, still more esteemed, is obtained in the southeastern parts of Asia and the adjacent islands, from the central part of the trunk of *aloexylon agallochum*, of the natural order *leguminosæ*, sub-order *cæsalpineæ*. This tree is found in Cochin-China and the Moluccas, where a character of sacredness is attached to it. Its fragrant wood is not only much prized in the East as a perfume, but many medicinal virtues are ascribed to it. Napoleon I. used it as a perfume in his palaces. The fragrance continues undiminished for years. *Lignaloes* is a corruption of *lignum aloes* (aloes wood).

ALOPECIA, a variety of baldness in which the hair falls off from the beard and eyebrows, as well as the scalp.

ALOSA, a genus of fishes, of the family *clupeidæ*. It contains two British species, the *A. finta*, or Twaite shad, and the *A. communis*, or allice shad. The shad resemble herrings in their form and structure, but are so much larger that they have been popularly called the mother of herrings. The allice shad is rare in the Thames. The American species, *clupea sapidissima*, is abundant on the Atlantic coast.

ALOST, or **AALST**, a city of Belgium, the capital of the former province of East Flanders. It is on the Dender, a tributary of the Scheldt. The city suffered severely in the German invasion of Belgium in 1914. It contained many historical edifices including the Church of St. Martin, one of the finest in Belgium. This church contained a famous painting by Rubens. There was a town hall, a college, hospital, and several other important public buildings. The industries included weaving, lace-making, and flax spinning. Pop. about 35,000.

ALPACA, the name given to a species of llama, which has for a long time back been domesticated in Peru. It was first found by Pizarro. Its modern zoölogical name is *auchenia paco*. It has a long, fine fleece, valuable in the woolen manufacture. There is a second species of llama in Peru, but its fleece is short, and, therefore, much less valuable. Also a cloth woven from the wool of the alpaca.

ALPENA, a city of Michigan, the county-seat of Alpena co. It is on Thunder Bay and on the Detroit and Mackinac railroad. It is situated near numerous lakes, making it a popular summer resort. There is a fish hatchery, public library and parks. The city has

important lumbering interests. There are also fisheries, tanneries, and manufactories of paper, cement, etc. Pop. (1910), 12,706; (1920), 11,101.

ALPES, BASSES (bäs-älp), a department in the S. E. of France, one of the five formed out of the old Provence; divided into five *arrondissements*, Barcelonnette, Castellane, Digne, Forcalquier, and Sisteron; capital, Digne. It is a mountainous region, the E. portion belonging to the crystalline Alps, with summits rising to upward of 11,000 feet; the W. portion to the limestone Alps. This latter portion is one of the most arid and desolate in France. West of the Durance, the principal river of the department, a chain of the limestone Alps runs westward under the name of the Montagne de Lure. The Durance partly bounds the department of the N. Its principal tributaries, all on the left bank, are the Ubaye in the N., leading up to the Col d'Argentière, the Bléonne, the Asse, and the Verdon, which partly separates Basses Alpes from Var. None of these rivers is navigable. The principal wealth of the higher parts of the department consists in its mountain pastures, to which every spring large numbers of sheep from the lower Rhone are led. Cattle, horses, mules, and asses are also reared. Cereals are grown in many places, and in the southern districts olives and great quantities of almonds are produced, and the silkworm is reared. Area, 2,697 square miles. Pop., about 110,000.

ALPES, HAUTES (hōt-älp), a department in the S. E. of France, adjoining the Italian frontier, formed almost entirely from the Dauphiné, but including a small part of the old Provence in the S.; divided into three *arrondissements*, Gap, Briançon, and Embrun; capital, Gap. In physical features it corresponds closely with Basses Alpes. In the N., on the borders of the department of Isère, the granite mass of Pelvoux rises to the height of 13,460 feet out of the limestone Alps. At its northern base runs the road from Grenoble by the Col du Lautaret (6,800 feet) to Briançon. The principal river is the Durance, which partly separates it from Basses Alpes, and, among its tributaries are the Buech, which flows from N. to S. in the W., and the Guil. The department is the poorest in France in natural resources. Its principal wealth consists of its mountain pastures, on which fine merino sheep are reared. Marble of all shades is abundant, and there is a considerable extent of anthracite near Briançon. Area, 2,178 square miles. Pop. about 110,000.

ALPES-MARITIMES (älp mär-ē-tēm′), a department in the extreme S. E. of France formed mainly from the province of Nice, ceded by Italy in 1860, but containing also the *arrondissement* of Grasse, detached from Var; divided into three *arrondissements*, Nice, Grasse, and Puget-Théniers; capital, Nice. The physical features are similar to those of Basses and Hautes Alpes. The limestone region in the S. W. is specially remarkable for its magnificent scenery, its deep and dark defiles or clus, and its numerous swallow-holes, in which streams disappear to reappear in fine springs. The mildness of the climate has caused several places on the coast to become favorable health resorts, especially Cannes, Antibes, Nice, and Mentone. The department surrounds on the land side the principality of Monaco. Among the products are vines, mulberries, olives, oranges, and citrons. Flowers are cultivated on a large scale for the making of perfumes, which forms the principal industry of the department. Area, 1,443 square miles. Pop., about 375,000.

ALPHA and **OMEGA**, the first and last letters of the Greek alphabet, sometimes used to signify the beginning and the end, or the first and the last of anything; also as a symbol of the Divine Being. They were also formerly the symbol of Christianity, and engraved accordingly on the tombs of the ancient Christians.

ALPHABET, so called from *alpha* and *beta*, the first two Greek letters, is the name given to a set of graphic signs, called letters, denoting elementary sounds, by the combination of which words can be visibly represented. Nearly 200 alphabets, ancient and modern, are known, of which about 50 are now in use. Most of them are developments from the primitive Phœnician alphabet, which was itself ultimately derived from the Egyptian hieroglyphic picture-writing.

All writing was in its origin pictorial. It began with ideograms, which developed into phonograms. Ideograms are pictures or symbols intended to represent either things or abstract ideas. Phonograms are the graphic symbols of sounds.

Five independent systems of ideographic writing have been invented: (1) The Cuneiform, which arose in the valley of the Euphrates, and developed into the Achæmenian syllabaries. (2) The Chinese, out of which the Japanese syllabaries have arisen. (3) The Hittite, which was the probable source of the Cypriote syllabary. (4) The Mexican

HEBREW NAMES	GREEK NAMES	HEBREW	PHOENICIAN	GREEK	LATIN	ARABIC	IRISH UNCICALS 6TH CENT.	RUSSIAN
ALEPH	ALPHA	א	𐤀	A	A	ا	𝔞	А
BETH	BETA	ב	𐤁	B	B	ب	𝔟	Б
GIMEL	GAMMA	ג	𐤂	Γ	C	ج	𝔠	Т
DALETH	DELTA	ד	𐤃	Δ	D	د	𝔡	Д
HE	EPSILON	ה	𐤄	E	E	ه	𝔢	Е
WAW	DIGAMMA	ו	𐤅		F	و	𝔣	
ZAYIN	ZETA	ז	𐤆	Z		ز	𝔷	Z
CHETH	ETA	ח	𐤇	H	H	ح	𝔥	Э
TETH	THETA	ט	𐤈	Θ		ط		Ф
IOD	IOTA	י	𐤉	I	I	ى	𝔦	Іий
CAPH	KAPPA	כ	𐤊	K	K	ك		К
LAMED	LAMDA	ל	𐤋	Λ	L	ل	𝔩	Л
MEM	MU	מ	𐤌	M	M	م	𝔪	М
NUN	NU	נ	𐤍	N	N	ن	𝔫	Н
SAMECH	(XI)	ס	𐤎	Ξ		س	𝔵	С
AYIN	OMICRON	ע	𐤏	O	O	ع	𝔬	О
PE	PI	פ	𐤐	Π	P	ف	𝔭	П
ZADE		צ	𐤑			ص		
KOPH	(KOPPA)	ק	𐤒		Q	ق	𝔮	
RESH	RHO	ר	𐤓	P	R	ر	𝔯	Р
SHIN	SIGMA	ש	𐤔	Σ	S	ش	𝔰	Ш
TAU	TAU	ת	𐤕	T	T	ت	𝔱	Т
	UPSILON			Y	V		𝔲	Y
	PHI			Φ	X			Ф
	CHI			X				Х
	PSI			Ψ				
	OMEGA			Ω				

ALPHABET CHARACTERS

picture writing. (5) The Egyptian hieroglyphics, from which the Phœnician alphabet was derived.

The Egyptian hieroglyphic picture writing may be traced back, by means of inscriptions, for more than 6,000 years, to the time of the second Egyptian dynasty. Of the 400 Egyptian phonograms, about 45 attained an alphabetic character—that is, they either denoted vowels, or could be associated with more than one vowel sound. Out of these alphabetic signs our own letters have grown. The transition to a pure alphabetic writing was made when the Phœnicians rejected the unnecessary portions of the complicated Egyptian system, the ideograms, the verbal phonograms, and the syllabic signs, and selected from the 45 variant symbols of elementary sounds a single sign for each of the 22 consonants found in Semitic speech.

A knowledge of alphabetical writing must have been obtained by the Greeks from the Phœnician trading settlements in the Ægean as early as the 10th century B. C.

By the middle of the 6th century, the Greek alphabet had in all essential respects attained its final development. About the 3d century B. C., the lapidary characters, corresponding to the capitals in Greek printed books, began to be replaced by more rounded forms, called uncials, while cursive forms were used for correspondence. Finally, between the 7th and 9th centuries A. D., the minuscules, which are the small letters of our printed Greek books, were evolved from a combination of uncials and cursives.

The Greek alphabet was the source, not only of the Latin, but of the other national alphabets of Europe. The Runes, which formed the alphabet of the Scandinavian nations, were based on early forms of the Greek letters, which, as Dr. Isaac Taylor has shown, were obtained about the 6th century B. C. from Greek colonies on the Black Sea, by Gothic tribes who then inhabited the region. In our own alphabet, the order of the letters does not differ very greatly from the Phœnician arrangement.

Our letters are named on the same principle as in the Latin alphabet. The vowels are called by their sounds; the consonants, by the sound of the letter combined with the easiest vowels, which, for convenience of utterance, precedes the continuants and follows the explosives.

ALPHEUS (al-fē'us), the principal river of Peloponnesus (Morea), rising in the S. E. of Arcadia, and flowing past the famous Olympia westward into the Ionic Sea. In its passage through Arcadia, a country consisting of cavernous limestone, it repeatedly disappears underground and rises again. With this fact was connected a remarkable myth. The river god Alpheus was said to have become enamored of the nymph Arethusa while bathing in his stream. To escape him, she prayed to Artemis, who changed her into a fountain, and opened up an underground passage for her to Ortygia, a small Sicilian island in the harbor of Syracuse. The river still pursued the nymph, passing from Greece to Sicily below the sea, without mingling his waters with it, and appearing in the spring that bubbles up by the shore, close by the fountain of Arethusa.

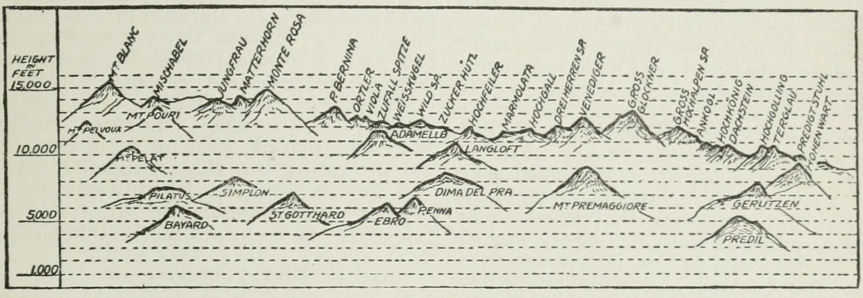
ALPHONSO. See ALFONSO.

ALPINE PLANTS, the name given to those plants whose habitat is in the neighborhood of the snow, on mountains partly covered with it all the year round. The mean height for the alpine plants of central Europe is about 6,000 feet; but it rises in parts of the Alps and in the Pyrenees to 9,000, or even more. The high grounds clear of snow among these mountains present a very well marked flora, the general characters of the plants being a low, dwarfish habit, a tendency to form thick turfs, stems partly or wholly woody, and large, brilliantly colored and often very sweet-smelling flowers. In the Alps of middle Europe the eye is at once attracted by gentians, saxifrages, rhododendrons, primroses of different kinds, etc.

ALPS, the highest and most extensive system of mountains in Europe, included between lat. 44° and 48° N., and long. 5° and 18° E., covering the greater part of northern Italy, several departments of France, nearly the whole of Switzerland, and a large part of Austria. The culminating peak is Mont Blanc, 15,781 feet high, though the true center is the St. Gothard.

The Alps in their various great divisions receive different names. The Maritime Alps, so called from their proximity to the Mediterranean, extend westward from their junction with the Apennines for a distance of about 100 miles; culminating points, Aiguille de Chambeyron, 11,155 feet, and Grand Rioburent, 11,142 feet; principal pass the Col di Tende, 6,158 feet, which was made practicable for carriages by Napoleon I. Proceeding northward the next group consists of the Cottian Alps, length about 60 miles; principal peaks: Monte Visco, 12,605 feet; Pic des Ecrins,

13,462; Pelvoux, 12,973. Next come the Graian Alps, 50 miles long, with extensive ramifications in Savoy and Piedmont; principal peaks: Aiguille de la Sassière, 12,326 feet; Grand Paradis, 13,300; Grande Casse, 12,780. To this group belongs Mont Cenis, 6,765 feet.



PROFILE MAP SHOWING MAIN PEAKS OF THE ALPS

The Pennine Alps form the loftiest portion of the whole system, having Mont Blanc (in France) at one extremity, and Mont Rosa at the other (60 miles), and including the Alps of Savoy and the Valais. In the E. the valley of the upper Rhone separates the Pennine Alps from the great chasm of the Bernese Alps. The principal heights of the Pennine Alps are Mont Blanc, 15,781 feet; Monte Rosa, 15,217; Mischabelhörner (Dom), 14,935; Weisshorn, 14,804; Matterhorn, 14,780. In the Bernese Alps, the Finsteraarhorn, 14,026; Aletschhorn, 13,803; Jungfrau, 13,671. The pass of Great St. Bernard is celebrated for its hospice. The easternmost pass is the Simplon, 6,595 feet, with a carriage road made by Napoleon I. Further E. are the Lepontine Alps, divided into several groups. The principal pass is the St. Gothard (6,936 feet). Highest peaks: Tödi, 11,887 feet; Monte Leone, 11,696. The Rhætian Alps, extending E. to about lat. 12° 30′ N., are the most easterly of the central Alps; principal peaks: Piz Bernina, 13,294 feet; Ortlerspitze, 12,814; Monte Adamello, 11,832. The Brenner Pass, 4,588 feet, from Verona to Innsbruck. The eastern Alps form the broadest and lowest portion of the system, and embrace the Noric Alps, the Carnic Alps, the Julian Alps, etc.; highest peak, the Grossglockner, 12,045 feet.

The Alps are very rich in lakes and streams. Among the chief of the former are Geneva, Constance, Zürich, Thun, Brienz, on the N. side; on the S. Maggiore, Como, Lugano, Garda, etc. The drainage is carried to the North Sea by the Rhine, to the Mediterranean by the Rhone, to the Adriatic by the Po, to the Black Sea by the Danube. In the lower valleys the mean temperature ranges from 50° to 60°. Half way up the Alps it averages about 32°—a height which, in the snowy regions, it never reaches. In respect to vegetation the Alps have been divided into six zones: The first is the olive; the second, the vine; the third, the mountainous; the fourth, the sub-Alpine or coniferous: the fifth, the pasture; and the sixth, the region of perpetual snow. Among the minerals that are obtained are iron and lead, gold, silver, copper, zinc, alum, and coal.

ALSACE-LORRAINE (äl-säs-lō-rān′) A naturally rich and historically interesting region, with fertile soil and active industries. It was ceded by France to Germany in 1871, and awarded to France by the Treaty of Versailles, 1919. Its utmost length from N. to S. is 123 miles; its breadth varies between 22 and 105 miles; and its area is 5,580 square miles, of which 1,353 belong to Upper Alsace (in the S.), 1,844 to Lower Alsace (N. E.), and 2,383 to Lorraine (N. W.). Pop. about 2,000,000. The French speaking population is mainly in the larger towns and in Lorraine. The Rhine flows 115 miles north-by-eastward along all the eastern boundary, and receives, below Strasbourg, the Ill from Alsace, 127 miles long. Other rivers are the Moselle, flowing through Lorraine past Metz, and its affluent, the Saar. About 48.5 per cent. of the entire area is arable, 11.6 meadow and pasture, and 30.8 under wood. Alsace-Lorraine produces much wine, grain, and tobacco; it is rich in mines, iron and coal; and manufactures iron, cotton, wool, silks, chemicals, glass, and paper. It contains the important cities of Strasbourg (pop. about 200,000); Mulhouse (pop. about 115,000); Metz (pop. about 85,000). As a French province, Alsace was divided into the departments of Haut-Rhin and Bas-Rhin. Lorraine fell into the depart-

ments of Meuse, Moselle, Meurthe, and Vosges.

In Cæsar's time Alsace-Lorraine was occupied by Celtic tribes, and formed part of ancient Gaul; but during the decline of the empire the Alemanni and other tribes from beyond the Rhine occupied and largely Germanized it. From the 10th century it formed part of the German empire, under various sovereign dukes and princes, latterly of the house of Hapsburg; till a part of it was ceded to France at the Peace of Westphalia (1648), and the rest fell a prey to the aggressions of Louis XIV., who seized Strasbourg (1681) by surprise in time of peace. By the Peace of Ryswick (1697), the cession of the whole was ratified. In 1814-1815 Russia would not hear of the restitution of Alsace-Lorraine to Germany; and not till 1871, after the Franco-Prussian war, were Alsace and German Lorraine, by the treaty of Frankfort, incorporated in the new German Empire. The great mass of the population were strongly against the change, and 160,000 elected to be French, though only 50,000 went into actual exile, refusing to become German subjects. For, at least since the era of the Revolution, Alsace in sentiment was wholly French. To France she gave the bravest of her sons—Kellermann, Kléber, and many another hero. Strasbourg first heard the "Marseillaise"; and MM. Erckmann-Chatrian, Lorrainers both, have faithfully represented their countrymen's love of *La Patrie* in the days of the third as of the first Napoleon.

France long cherished the hope of regaining the lost territories, but had resigned herself to the inevitable when the war of 1914-1918 suddenly thrust on her by Germany enabled her, through the victory of the Allies, to realize her dream. See FRANCE; WORLD WAR.

ALSBERG, CARL LUCAS, an American biochemist, born in New York in 1877. He graduated from Columbia University in 1896 and later studied in Germany. He was in the chemical department of Harvard University from 1905 to 1908. In the latter year he became chemical biologist for the Bureau of Plant Industry, serving until 1912, when he became Chief of the Bureau of Chemistry in the United States Department of Agriculture. He was a member of many chemical societies.

ALSTRŒMERIA (al-stra-mē'rē-a), a genus of South American plants, order *amaryllideæ*, some of them cultivated in European greenhouses and gardens. *A. salsilla* and *A. avata* are cultivated for their edible tubers.

ALTAI MOUNTAINS (al'tī), an important Asiatic system on the borders of Siberia and Mongolia, partly in Russian and partly in Chinese territory, lying between lat. 46° and 53° N., long. 83° and 91° E., but having great eastern extensions. The Russian portion is comprised in the governments of Tomsk and Semipalatinsk, the Chinese in Dsungaria. The rivers of this region are mostly headwaters of the Obi and Irtish. The highest summit is Byeluka, height 11,000 feet. The vegetation is varied and abundant. The mountain forests are composed of birch, alder, aspen, fir, larch, stone pine, etc. The wild sheep has here its native home and several kinds of deer occur. The Altai are exceedingly rich in minerals, including gold, silver, copper, and iron. The inhabitants consist chiefly of Russians and Kalmuks.

ALTAR, an erection made for the offering of sacrifices for memorial purposes, or for some other object. An altar designed for sacrifice is mentioned in Scripture as early as the time of Noah (Genesis viii: 20).

At Sinai directions were given that altars should be of earth or of stone unhewn, and that the ascent to them should not be by steps (Exod. xx: 24-26). When the tabernacle worship was established, there was an altar of wood covered with brass, designed for sacrifice, and one overlaid with gold, on which incense was burned (Exod. xxvii: 1-8; xxxi: 1-10). Both had projections at the four corners of the upper surface. To those of the brazen altar victims were bound, and a fugitive from death seizing hold of one of these could not legally be dragged away to meet his doom.

In the early Christian centuries altars were generally of wood. During the 6th century stone was employed in the construction, and this continued to the time of the Reformation.

In the Church of Rome an altar is essential, it being believed that in the mass an actual though bloodless sacrifice is offered for sin. Formerly, also, there was an upper altar (superaltare), which was a small portable one for the consecration of the communion elements.

The stone altars, which were in the churches of the Church of England when the Reformation began, were removed about 1550, and tables substituted for them.

Many of the old ethnic nations built altars for idolatrous worship on the tops of hills or in groves. The Greeks and Romans built high altars to the heavenly

gods, and some of lower elevation to the demigods and heroes, while they worshipped the infernal gods in trenches scooped out of the ground.

ALTENBURG (-börg), the capital of the former Duchy of Saxe-Altenburg, situated on the Pleisse, 30 miles S. of Leipsic. Standing on an almost perpendicular rock of porphyry, the old castle of Altenburg forms a striking feature in the landscape. It is memorable as the place whence, in 1455, a neighboring knight, Kunz von Kaufungen, carried off the young Saxon princes, Ernest and Albert. Before he could reach the Bohemian frontier, he was apprehended by a charcoal burner, and handed over to the executioner. Brushes, woolen goods, gloves, and cigars are among the manufactures. Pop. about 45,000. The Duchy became a republic in 1918.

ALTERATIVE, a kind of medicine which, when given, appears for a time to have little or no effect, but which ultimately changes, or tends to change, a morbid state into one of health.

ALTGELD, JOHN PETER, author, lawyer, and judge, born in Germany, in December, 1847. He was Judge of the Superior Court at Chicago in 1886-1901, and Governor of Illinois in 1893. His pardon of the Anarchists caused much controversy. He wrote "Our Penal Machinery and Its Victims," "Live Questions," and other books. He died in 1902.

ALTISCOPE, an instrument consisting of an arrangement of mirrors in a vertical framework, by means of which a person is enabled to overlook an object (a parapet, for instance) intervening between himself and whatever he desires to see, the picture of the latter being reflected from a higher to a lower mirror, where it is seen by the observer.

ALTITUDE, in mathematics the perpendicular height of the vertex or apex of a plane figure or solid above the base. In astronomy it is the vertical height of any point of body above the horizon.

ALTO, in music, the highest singing voice of a male adult, the lowest of a boy or a woman, being in the latter almost the same as contralto. The alto, or counter-tenor, is not a natural voice, but a development of the falsetto.

ALTON, a city in Madison co., Ill., on the Mississippi river, 5 miles above the mouth of the Missouri, and on several trunk line railroads; 21 miles N. of St. Louis, Mo. It is built on a high limestone bluff, and has very picturesque surroundings. The Mississippi is here spanned by a costly railroad bridge, and the city is connected with Upper Alton, 2 miles distant, by a trolley line. Alton has important manufactures, and a large river trade. Here are the Cathedral of Sts. Peter and Paul, St. Joseph's Hospital, Ursuline Convent (all Roman Catholic), Hayner Memorial Public Library, Monticello Seminary, Old Women's Home, several National banks, and daily and weekly newspapers. Upper Alton is the seat of Shurtleff College (Baptist), and Wyman Institute. Elijah P. Lovejoy, the abolitionist, was murdered at Alton by a mob in 1837. A monument to his memory was erected in 1897. Pop. (1910) 17,528; (1920) 24,682.

ALTONA, a city of Schleswig-Holstein, on the right bank of the Elbe river. Its boundary joins Hamburg on the east and it practically forms one city with Hamburg. It is an important trade center and has many important industrial works, including cotton and woolen mills, iron foundries, glass works, breweries, etc. Pop. about 200,000.

ALTOONA, a city in Blair co., Pa.; on the Pennsylvania and the Altoona, Clearfield and Northern railroads; 117 miles E. of Pittsburgh. It is at the E. base of the Allegheny Mountains, at an elevation of 1,180 feet above sea-level, where the railroad begins to ascend the mountains at a grade of 90 feet to the mile. The city contains extensive machine shops of the Pennsylvania railroad, large individual car works, rolling and planing mills, a hospital, two convents, a public library, general offices of the Pennsylvania railroad, and several National banks. Altoona is a mining, manufacturing, lumbering, and farming trade center for central Pennsylvania, and has had a rapid development. Pop. (1910) 52,127; (1920) 60,331.

ALTORF, or **ALTDORF**, a town of Switzerland, in the canton of Uri, near Lake Lucerne. A tower marks the spot where William Tell is said to have shot the apple from his son's head. The adjacent village of Burglen is Tell's traditional birthplace. Pop. about 4,000.

ALTO-RILIEVO, or **ALTO-RELIEVO**, sculptured work of which the figures project more than half their true proportions. When they project just one-half, the term used is mezzo-relievo; and when less than half, basso-relievo, or in English, bas-relief.

ALTRANSTÄDT (ält'rän-stedt), an important village in the Prussian province of Saxony, near Lützen. It is fa-

mous for its castle, where, on Sept. 24, 1706, Charles XII. of Sweden signed the peace with August II., King of Poland. By this treaty, August II. agreed to vacate the Polish throne, not to enter any alliances against Sweden, especially any with the Czar, and to give up the Livlander Patkul, to grant the Swedish winter quarters in Saxony, and pledge himself not to persecute the Evangelical Church. This treaty did not go into effect until Nov. 26, because August felt that, by reason of a previous peace, he was obliged to support the Russians in their attack upon the Swedish General Mardefeld. After the defeat of Charles XII. at Poltava, August II., on Aug. 8, 1709, declared the Peace of Altranstädt to be void under the pretext that his representatives had exceeded their authority. Through the Treaty of Altranstädt of Aug. 30, 1707, Charles XII. obtained from the Emperor Joseph I. religious liberty and toleration of the Protestants of Silesia.

ALTSHELER, JOSEPH ALEXANDER, an American writer, born in Three Springs, Ky., in 1862. He studied at Liberty College, Ky., and Vanderbilt University. After newspaper work on the staff of the Louisville "Courier-Journal," he joined the staff of the New York "World" in 1892, where he remained until his death. He was the author of many novels and stories. Among these are "A Soldier of Manhattan" (1897); "The Horsemen of the Plains" (1901); "The Border Watch" (1912); "The Forest of Swords" (1915); "The Hunters of the Hills" (1916); "The Rulers of the Lakes" (1917). He died in 1919.

ALUM, the name given to double salts of sulphate of aluminum with sulphates of potassium, sodium, ammonium, or of other monatomic metals, as silver, thallium cæsium, rubidium. They crystallize in octohedra. Potash alum, $Al_2K_2(SO_4)_4 + 24H_2O$, is prepared by the decomposition of a shale containing iron pyrites. Alum has a sweet astringent taste, reddens litmus paper, and dissolves in its own weight of boiling water. Sodium alum is very soluble. Ammonia alum is often prepared by adding the ammonia liquor of gas-works instead of potash. Alum is used in dyeing and in preparing skins, etc. Alum is used in medicine as an astringent in doses of 10 to 20 grains. Ammonia alum, a mineral, called also tschermigite. Feather alum, a mineral, called also halotrichite. Iron alum, a mineral, called also halotrichite. Magnesia alum, a mineral, called also pickeringite. Manganese alum, a mineral, called also apjohnite. Native alum, a mineral, called also kalinite. Soda alum, a mineral, called also mendozite. Saccharine alum, a composition made of common alum, with rose-water and the white of eggs boiled together to the consistence of a paste, and thus capable of being molded at pleasure. As it cools it grows as hard as an ordinary stone.

ALUMINO-THERMICS, that branch of metallurgy which has to do with the utilization of heat developed by burning metallic aluminum. Its chief uses are to separate oxides, chlorides, and sulphides from other metals; to increase the temperature of other metals so that they may be welded by force of pressure; to obtain molten iron to be used in preparing broken iron and steel. It was first employed by Frederick Wöhler, the discoverer of aluminum. The process was perfected by other German scientists, especially by Hans Goldschmidt. He was the first to succeed in employing it on a large scale. It is now used widely in mechanical engineering.

ALUMINUM, a metal discovered by Wöhler in 1827, as a gray powder, but in 1847 in the form of small, glittering metallic globules. In 1854, H. St. Clair Deville isolated aluminum into a state of almost perfect purity. He found that aluminum could be prepared in a compact form at a comparatively small expense. It is a white metal, somewhat resembling silver, but possessing a bluish hue, which reminds one of zinc. Exposed to dry or moist air, it is unalterable, and does not oxidize or tarnish like most common metals. Salt water affects it less than it does silver, tin, or copper. Neither cold nor hot water has any action upon it. When cast into molds, it is a soft metal like pure silver, and has a density of 2.56; but when hammered or rolled, it becomes as hard as iron, and its density increases to 2.67. It is, therefore, a very light metal, being lighter than glass, and only one-fourth as heavy as silver.

Aluminum has, in recent years, come into common use for culinary utensils and other domestic uses, and in manufactured articles where strength and lightness are requisites. It is especially valuable in the making of aeroplanes and automobiles. Not being acted upon by organic secretions, it is used for optical, surgical, and chemical instruments and apparatus. Aluminum leaf and wire may be employed with great advantage in place of silver leaf for decoration, or silver wire for embroidery. Of late it has come to be used in shipbuilding, especially for torpedo-boats. And as it is especially suitable

for cooking-vessels, efforts to cast it for pots and pans have often been made, but unsuccessfully till 1895 when aluminum was, weight for weight, three times the price of copper, but, bulk for bulk, the cheaper metal. In 1855 Napoleon III. paid the expense for making industrial use of aluminum at Javel. Many other manufactories of aluminum were also started about the same time in France. In 1856, Alfred Mounier produced aluminum at Camden. In 1857, the price of aluminum was from $28 to $32 a pound. Between 1862 and 1877 it ranged from $12 upward, and when in 1888 electrical methods of production were used, the price of aluminum was reduced to less than $1. In recent years it has dropped to a quarter and even a fifth of that price.

The sources most used for the production of aluminum are bauxite, a mineral first found near Baux, but since then found in Styria in Austria, in Ireland, and in many places in the United States; and cryolite, found on the W. coast of Greenland. There is no other useful metal, iron not excepted, which is widely scattered over the earth and which occurs in such abundance. The value of the aluminum produced in the United States in 1918 was $41,159,000. The production of bauxite was 569,000 long tons, valued at $3,244,000. For occurrence and production in the United States, see BAUXITE.

Aluminum Alloys.—The aluminum bronzes, now becoming so generally introduced, are the alloys of aluminum and copper, in which the amount of copper considerably exceeds that of aluminum. The value of these aluminum bronzes consists in their non-corrosive properties and in their strength.

ALUNITE, a chemical compound of aluminum and potassium sulphate. It is used as a source of alum. It is found chiefly in Europe and also in several parts of the United States, especially in Colorado.

ALVA, or ALBA, FERDINAND ALVAREZ DE TOLEDO, DUKE OF, prime minister and general of the Spanish armies under Charles V. and Philip II., was born in 1508. He fought in the wars of Charles V. in France, Italy, Africa, Hungary, and Germany. He is more especially remembered for his bloody and tyrannical government of the Netherlands (1567-1573), which had revolted, and which he was commissioned by Philip II. to reduce to entire subjection to Spain. Among his first proceedings was to establish the "Council of Blood," a tribunal which condemned, without discrimination, all whose opinions were suspected, and whose riches were coveted. People by hundreds of thousands abandoned their country. The most oppressive taxes were imposed, and trade was brought completely to a standstill. Resistance was only quelled for a time, and soon the provinces of Holland and Zealand revolted against his tyranny. A fleet which was fitted out at his command was annihilated. Hopeless of finally subduing the country, he asked to be recalled, and, accordingly, in December, 1573, Alva left the country, in which, as he himself boasted, he had executed 18,000 men. He was received with distinction in Madrid. He had the honor, before his death, of reducing all Portugal to subjection to his sovereign. He died Jan. 12, 1582.

ALVARADO, PEDRO DE (äl-vä-rä'dō), a famous comrade of Cortes, was born at Badajoz, toward the close of the 15th century. In 1518 he sailed for the New World, and accompanied Grijalva in his exploring voyage along the shores of the American continent. It was now that the Spaniards heard of the riches of Montezuma, and of his vast empire. Alvarado was soon sent back to Cuba to inform the Governor, Velasquez, of the result of the expedition. In February, 1519, he sailed with Cortes from Havana, and took an active part in the conquest of Mexico. He died in 1541.

ALVAREZ, DON JOSÉ (al-vä-'räth), the greatest of modern Spanish sculptors, was born in 1768, in the province of Cordova. During youth he labored with his father, a stone-mason; and when 20 years old, began to study drawing and sculpture in the academy at Granada. In 1794 he was received into the Academy at San Fernando, where, in 1799, he gained the first prize and a grant to enable him to study at Paris and Rome. In Rome, he executed a famous group, now in the Royal Museum at Madrid, representing a scene in the defense of Saragossa. He died at Madrid in 1827.

ALVORD, CLARENCE WALWORTH, an American educator, born in Greenfield, Mass., in 1868. He graduated from Williams College in 1891, and afterward took post-graduate studies at the University of Berlin and the University of Chicago. After having taught in several schools in Massachusetts, he was appointed instructor in history at the University of Illinois in 1897, and became, successively, associate professor, assistant professor, and full professor, the latter in 1913. He devoted special atten-

tion to the study of the history of the Middle West, was editor of the "Mississippi Valley Historical Review," editor-in-chief of the "Illinois Centennial History," edited many volumes dealing with the early history of the Middle Western States, and was the author of "Mississippi Valley and British Policy" (1917).

ALWAR, a city of India, about 100 miles from Delhi. It is the capital of the state of Alwar. The town has several important public buildings, including the Royal Palace and several churches. Pop. about 45,000.

ALWOOD, WILLIAM BRADFORD, an American horticulturist, born in Delta, O., in 1859. He studied at Ohio State University and George Washington University and carried on post-graduate studies in Germany and France. He was superintendent of the Ohio Agricultural Experiment Station from 1882 to 1886. From 1886 to 1888 he was special agent of the United States Department of Agriculture. From 1888 to 1904 he was vice-director of the Virginia Agricultural Experiment Station. He carried on important researches in horticulture and mycology, was appointed enological chemist in the United States Bureau of Chemistry in 1906, wrote much on horticultural subjects, and was a member of many American and foreign horticultural and other scientific societies.

ALYPIN, a drug used often as a substitute for cocaine. It occurs as a white crystalline powder having a bitter taste and is usually soluble in water and alcohol.

AMADEUS, a common name in the house of Savoy. The first who bore it was Count Amadeus, who lived in the 11th century, but the first to make an important figure in history was Amadeus V. (1249-1323). Amadeus VIII., born in 1383, secured the elevation of Savoy into a duchy. He was elected Pope in 1439, as Felix V., but resigned later. Amadeus I., of Spain, born in 1845, son of King Victor Emmanuel of Italy, was elected King of Spain in 1870, abdicated in 1873, and died in 1890.

AMADIS, a much used name in the chivalric poetry of the Middle Ages. Of the numerous romances that may be grouped under it, that which narrates the adventures of Amadis of Gaul is at once the most ancient and the best. Castilian and Portuguese versions of the 13th and 14th centuries were lost. Instead of these, we have a Spanish version of almost 100 years later, written by Garcia Ordoñez de Montalvo about 1465, but first printed in 1508. This prose romance is one of the three spared by the licentiate and the barber at the burning of Don Quixote's books. Its hero is Amadis, the model of every knightly virtue, son of King Perion of Gaul and Elisena, Princess of Brittany. The work is wearisome from its length, but it contains many pathetic and striking passages, and has great value as a mirror of the manners of the age of chivalry.

The Spanish Amadis romances consist of 12 books, of which the first four contain the history of Amadis of Gaul. The earliest edition now in existence bears the date of 1508. A French translation appeared in 1540, an Italian in 1546, and an English in 1588, while a version of German was published in 1583. Lastly, a Frenchman, Gilbert Saunier Duverdier, at the beginning of the 17th century, arranged all these romances into a harmonious and consecutive series, and with his compilation in seven volumes, the "Roman des Romans," brought the history of Amadis and the series of about 50 volumes to a close. A version of the old romance in French was published by Creuzé de Lesser, in 1813; in English, by William Stewart Rose, in 1803; while the literary skill of Southey produced, in 1803, an abridgment that is still readable.

AMALFI (am-al'fē), a city and seaport, in the province of Salerno, Italy; on the Gulf of Salerno; 22 miles S. E. of Naples. It was founded in the 4th century; was the birthplace of Flavio Gioja, the inventor of the mariner's compass; became the capital of the republic; and attained very large commercial importance. It contained a cathedral with bronze doors cast in Constantinople in 1066, and a Capuchin monastery. On Dec. 24, 1899, a portion of the rocks and land facing the Gulf suddenly slid into the water, carrying down the ancient monastery building and other structures. Pop. about 7,000.

AMALGAM, the union or alloy of any metal with quicksilver (mercury).

In mineralogy, a mineral classed by Dana under his "Native Elements." It occurs in Hungary, the Palatinate, Sweden, Spain, Chile, and elsewhere.

Gold amalgam is a mineral occurring in white, crumbling grains about the size of a pea, or in yellowish-white four-sided prisms. It consists of gold 39.02, and mercury 60.98. It is found in Colombia and in California.

AMALIA, ANNA, Duchess of Saxe-Weimar, was born in 1739, and, left a widow in the second year of her mar-

riage (1758), by her judicious rule as guardian of her infant son, she enabled the country to recover from the effects of the Seven Years' War. She attracted to Weimar such men as Herder, Goethe, Musæus, Schiller. The battle of Jena is said to have broken her heart; she died (1807) six months after that event.

AMANA and **AMANUS**, a chain of lofty mountains separating Cilicia from Syria. This name was given by the Greek and Roman geographers, and is also sometimes applied by modern geographers to the branch of Mount Taurus, which, beginning at the mountain of Cape Hynzyr, on the Gulf of Scanderoon, runs in a N. E. direction into the interior.

AMANITA, a genus of *hymenomycete fungi*, nearly allied to the mushrooms *agaricus*. Several of the species are edible, notably the delicious orange (*A. cæsarea*), but the majority are poisonous. *A. muscaria*, which is quite common in woods, especially of fir and beech, in Great Britain, is one of the most dangerous fungi. It is sometimes called fly agaric, being used in Sweden and other countries to kill flies and bugs, for which purpose it is steeped in milk. The pileus or cap is of an orange-red color, with white warts, the gills white, and the stem bulbous. It is used by the Kamchadales to produce intoxication.

AMARANTACEÆ, or **AMARANTHACEÆ**, a natural order of plants, consisting of "chenopodal exogens, with separate sepals opposite the stamens, usually one-celled anthers, a single ovary often containing several seeds, and scarious flowers buried in imbricated bracts." The order is divided into three sub-orders —*gomphreneæ*, *achyrantheæ*, and *celoseæ*. About 500 species are known. They occur chiefly in the tropics of America and Asia; a number also are Australian. The cockscomb, the globe amaranth, the prince's feather, and love-lies-bleeding are found in gardens. Many *amaranthaceæ* are used as pot herbs.

AMARANTUS, or **AMARANTHUS**, a genus of plants, the typical one of the order *amarantaceæ*. It is placed under the sub-order *achyrantheæ*. It has green, purplish or crimson flowers in large spiked clusters, which are very ornamental. *A. melancholicus* and tri-color are tender annuals, and *A. sanguineus* and *caudatus* common border flowers. The leaves of *A. viridis* are employed externally as an emollient poultice. *A. obtusifolius* is said to be diuretic. *A. debilis* is used in Madagascar as a cure for syphilis. The seeds of *A. frumentaceus* and *A. anardana* are used as corn in India.

AMARILLO, a city of Texas, in Potter co. It is on the Fort Worth and Denver City, the Atchison, Topeka and Santa Fé, the Chicago, Rock Island, and Gulf, the Pecos and Northern Texas, and the Southern Kansas and Texas railroads. It has important agricultural and manufacturing interests. Pop. (1910) 9,957; (1920) 15,494.

AMARNA LETTERS, a series of letters written on clay tablets discovered in 1887 in the village of Telel-Amarna in Egypt. The letters when deciphered were found to include the correspondence carried on between the Egyptian sovereign and his officers in other countries, about 1400 B. C. With three exceptions they are written in the cuneiform character. The letters throw invaluable light on conditions in Babylon, Egypt, Palestine, and other countries at that time.

AMARYLLIDACEÆ, an order of plants in the narcissal alliance of the class endogens. The representatives of the order in the English flora are narcissus, gelanthus, and leucojum. Beautiful as they are, most of them have poisonous bulbs. The Hottentots are said to dip the heads of their arrows in the viscid juice of the bulbs of *hæmianthus toxicarius* and some allied species. Several are emetic, having a principle in their composition like that of the squill. *Oporanthus luteus* is purgative, *alströmeria salsilla* diaphoretic and diuretic, and *amaryllis ornata* astringent. A kind of arrowroot is prepared in Chile from *alströmeria pallida* and other species. A liquor called pulque is made from the wild agave of Mexico.

AMATI (am-ä'tē), a family of Cremona, in the 16th and 17th centuries, famous for their violins, which are at the present time valued very highly on account of their tone. The founder of the violin works at Cremona was ANDREA AMATI, who died 1577. His sons, ANTONIO, born about 1555, and GIROLAMO (1556-1630), brought to the business still greater fame. In 1595, the famous violin which was designed for Henry IV. and is still in existence, was made by them. Girolamo's son, NICCOLO, born in 1596, brought the brilliancy of the Cremona violin to the highest perfection. He was the teacher of Stradivarius and Andrea Guarnerius. He died April 12, 1684.

AMATO, PASQUALE, an Italian baritone singer, born in Naples in 1878. He studied music in Naples Conservatory and made his first appearance at the Bellini Theater. He made an instant success and within a few years had be-

come one of the leading baritone singers. He sang in German and South American theaters and in 1909 he became a member of the Metropolitan Opera Company in New York, appearing in each successive season from that date. He also toured the country as a concert singer and became widely and favorably known.

AMAUROSIS, a disease of the eye, arising from impaired sensibility of the retina. Amaurosis arises from inflammation or turgescence of the retina, from derangement of the digestive organs, from exercise of the eye on minute objects, and from injury or disease of the fifth nerve or its branches, or from injury of the eye itself.

AMAZON, a river of South America, the largest in the world, formed by a great number of sources which rise in the Andes; the two head branches being the Tunguragua or Marañon and the Ucayale, both rising in Peru, the former from Lake Lauricocha, in lat. 10° 29′ S., the latter formed by the Apurimac and Urubamba, the headwaters of which are between lat. 14° and 16° S.; general course N. of E.; length, including windings, between 3,000 and 4,000 miles; area of drainage basin, 2,300,000 square miles. It enters the Atlantic under the equator by a mouth 200 miles wide divided into two principal and several smaller arms by the large island of Marajo, and a number of smaller islands. In its upper course, navigation is interrupted by rapids, but from its mouth upward for a distance of 3,300 miles (mostly in Brazil) there is no obstruction. It receives the water of about 200 tributaries. Northern tributaries: Santiago, Morona, Pastaça, Tigre, Napo, Putumayo, Japura, Ria Negro (the Cassiquiare connects this stream with the Orinoco), etc. Southern: Huallaga, Ucayale, Javari, Jutay, Jurua, Coary, Purus, Madeira, Tapajos, Xingu, etc.

At Tabatinga, where it enters Brazilian territory, the breadth is 1½ miles; below the mouth of the Madeira, it is 3 miles wide, and where there are islands often as much as 7; from the sea to the Rio Negro, 750 miles in a straight line, the depth is nowhere less than 30 fathoms; up to the junction of the Ucayale there is depth sufficient for the largest vessels. The Amazonian water system affords some 50,000 miles of river suitable for navigation. The singular phenomenon of the bore, or, as it is called on the Amazon, the *pororoca*, occurs at the mouth of the river at spring-tides on a grand scale. The river swarms with alligators, turtles, and a great variety of fish. It is a great highway of commerce. The Amazon was discovered by Yañez Pinçon in 1500, but the stream was not navigated by any European till 1540, when Francis Orellana descended it. He stated that he found on its banks a nation of armed women, and this circumstance gave the name to the river.

AMAZON, or **AMAZONE** (from *a* = without, and *mazos*=the breast, from the story that the Amazons cut off their right breast to prevent its interfering with the use of the bow), a nation on the river Thermodon, the modern Termeh in Pontus, in Asia Minor, said to consist entirely of women renowned for their love of manly sports, and as warriors. Men were excluded from their territory, and commerce was held only with strangers, while all male children born among them were killed. They are mentioned by Homer.

Also the females of an Indian tribe on the banks of the great river Maranon, in South America, who assisted their husbands when fighting against the Spaniards, and caused the Maranon to receive the new name of the Amazon, and any female soldiers, such as the band of female warriors kept by the King of Dahomey in Africa.

In entomology, Huber's name for the neuters of a red ant (*polyergus*), which are accustomed to sally forth in large numbers from their nests, in military array, and, proceeding to some neighboring anthill belonging to another species, plunder it of the larvæ of its neuters. These, when hatched, become a kind of pariah caste in the habitation of the Amazons.

AMBALA or **UMBALLA**, a city of India, the capital of the district of the same name in the Punjab. It is a well built town and contains a handsome Gothic church, several hospitals and asylums. It is also an important military station. Pop. about 90,000.

AMBASSADOR, a diplomatic officer of the highest rank, sent by a sovereign or nation to another power to treat on affairs of state, representing not only the affairs, but also the person, of his sovereign or executive and entitled to almost equal respect. Anciently ambassadors were sent only on special missions, after the performance of which they returned, their functions corresponding to those of the modern ambassador extraordinary; only in modern times did there originate the employment of an ambassador residing permanently at the seat of a foreign government, who is expected to familiarize himself with its politics and to exert his influence

for the advantage of his own nation. At the outbreak of war between his own government and that to which he has been sent, the ambassador is dismissed or summoned to return. If the ambassador appointed by one government be considered by the state to which he is assigned personally disagreeable or not calculated to produce friendly relations between the two countries, he may be objected to as a *persona non grata*, and his reception refused; but if he is actually received he is entitled to each and every privilege of his office. These privileges have never been closely defined, but include the inviolability of the person of the ambassador from public and private violence; immunity from all jurisdiction, both civil and criminal, of the country in which he is a resident; and similar exemption from local jurisdiction for his family, household, and retinue. His house is sacred, but he cannot harbor malefactors. He must regard the laws and customs of the country in which he is a resident, or complaint may be made to the government he represents, and his recall demanded, or if his offense be serious, he may be sent beyond its borders by the offended power and a trial in his own country exacted. In the United States, jurisdiction in all diplomatic cases is by the Constitution delegated to the Supreme Court. The term ambassador was not formerly applied to American diplomatic agents, the highest rank being envoy extraordinary and minister plenipotentiary, until 1893.

AMBER, as a mineral, called also succinite, from Latin *succinum*=amber. Its color is generally yellow, but sometimes reddish, brownish, or whitish and clouded. It is resinous in luster, always translucent, and sometimes transparent. It is brittle, and yields easily to the knife. It fuses at 287° C. It is also combustible, burning readily with a yellow flame, and emitting an agreeable odor. It is also highly electrical, so much so that electricity is derived from the Greek word *elektron*, or *elektros*=amber. It is found in Europe, Asia, and America. It is valued as a gem.

Pliny was correct when he considered it to be an exudation from trees of the pine family, like gum from the cherry, and resin from the ordinary pine. Its exact age is as yet undetermined. Of 163 species of plants found in it, 30 still exist. Eight hundred species of insects have also been met with in it, with remains of animals of other classes.

In Scripture, the word amber, Hebrew *chasmal* (Ezek. i: 4, 27; vii: 2), is not what is now called by the name, but a mixed metal.

AMBERGRIS, a substance derived from the intestines of the sperm whale, and found floating or on the shore; yellowish or blackish white; very light; chiefly composed of a peculiar fatty substance. Its odor is very agreeable, and hence it is used as a perfume.

AMBLYOPSIS, a North American bony fish, found in the Mammoth Cave of Kentucky, and interesting as illustrating in the rudimentary condition of its eyes the effects of darkness and consequent disuse. It only measures a few inches in length, is colorless, and has its small eyes covered by the skin. It seems able, however, to hear acutely, and the wrinkles of skin on its head are regarded as special feeling organs. Wholly blind fishes are found only in the unsunned ocean depths.

AMBOISE (ämb-wäz'), a French town in the department of Indre-et-Loire, on the Loire, 15 miles by rail E. of Tours. It lies in a region rich in vineyards. The town is memorable for the Huguenot conspiracy (1560), which cost the lives of 1,200 Protestants, and as the place whence was issued the Edict of Amboise (1563), conceding certain privileges to the Huguenots. The castle of Amboise, from 1431, was a frequent residence of the Valois kings; the birth and death place of Charles VIII. Pop. about 5,000.

AMBOISE, GEORGE D', a French Cardinal, and Minister of State, born in 1460. He became successively Bishop of Montauban, Archbishop of Narbonne, and of Rouen. Louis XII. made him Prime Minister. He reformed the Church, remitted the people's burdens, and conscientiously labored to promote the public happiness. Died in 1510.

AMBOYNA, AMBOINA, APON, or THAU, the most important of the Moluccas or Spice Islands belonging to the Dutch, lies S. W. of Ceram, and N. W. of Banda. Area, 265 square miles. Population about 40,000, nearly a third Mohammedans. A bay runs into the island lengthwise, forming two peninsulas, the northern called Hitu, and the southern Leitimor. Amboyna is mountainous, well watered, fertile, and healthy. Clove, sago, mango, and cocoanut trees are abundant, also fine timber for cabinet work. The Dutch took Amboyna from the Portuguese in 1605. The British settlement was destroyed by the Dutch in the terrible Amboyna massacre of 1623, for which, in 1654, Cromwell

exacted compensation. The British held the island, 1796-1802. It finally became Dutch in 1814. Amboyna, capital of the Dutch Moluccas, is situated on the N. W. shore of Leitimor, on the Bay of Amboyna, and has a good roadstead. The government buildings are in Fort Victoria.

AMBRIDGE, a borough of Pennsylvania, in Beaver co., about 16 miles N. W. of Pittsburgh. It is on the Pennsylvania railroad and the Ohio river. It is an important industrial center having manufactures of bridges, metal moldings, and tubes. Pop. (1910) 5,205; (1920) 12,730.

AMBRIZ (äm-brēth'), a seaport and region in the Portuguese colony of Angola, on the coast of Old Guinea, at the mouth of the Loje. The official name is Oporto do Ambriz or Mbrish. It has a number of factories and a trade in India rubber, coffee, and palm oil. Its former trade in ivory is now transferred to Nokki and other places on the Kongo.

AMBROSE, ST., a celebrated father of the Church; born in 333 or 334 A. D., probably at Treves, where his father was prefect; died in 397. He was educated at Rome, studied law, practiced as a pleader at Milan, and, in 369, was appointed governor of Liguria and Æmilia (north Italy). His kindness and wisdom gained him the esteem and love of the people, and, in 374, he was unanimously called to the bishopric of Milan, though not yet baptized. For a time he refused to accept this dignity, but he had to give way, and at once ranged himself against the Aryans. In his struggle against the Aryan heresy he was opposed by Justina, mother of Valentinian II., and for a time by the young Emperor himself, together with the courtiers and the Gothic troops. Backed by the people of Milan, however, he felt strong enough to deny the Aryans the use of a single church in the city. He had also to carry on a war with paganism, Symmachus, the prefect of the city, an eloquent orator, having endeavored to restore the worship of heathen deities. In 390, on account of the ruthless massacre at Thessalonica, ordered by the Emperor Theodosius, he refused him entrance into the church of Milan. He wrote Latin hymns, introduced the Ambrosian chant, and compiled a form of ritual known by his name.

AMBROSIA, in Greek mythology, the food of the gods, as nectar was their drink.

AMBULANCE, a hospital establishment which accompanies an army in its movements in the field for the purpose of providing assistance and surgical treatment to the soldiers wounded in battle. The name is also given to one of the carts or wagons used to transfer the wounded to the hospital. Americans of both sexes volunteered for ambulance service in France almost from the beginning of the World War of 1914-1918. Thousands of American ambulances, devices, drivers, and attendants were employed on the battle fields of France, Italy, and Russia after America entered the war. See RED CROSS.

AMEN, a Hebrew word of asseveration, equivalent to "Yea," "Truly," which has been commonly adopted in the forms of Christian worship. In Jewish synagogues, the "Amen" is pronounced by the congregation at the conclusion of the benediction given at parting. Among the early Christians, the prayer offered by the presbyter was concluded by the word "Amen," uttered by the whole congregation (cf. I Cor. xiv: 16). According to Tertullian, none but the faithful were permitted to join in the response. In the Greek Church, this word was pronounced after the name of each person of the Trinity; and, at the close of the baptismal formula, the people responded. At the conclusion of prayer, it signifies (according to the English Church Cathechism) "So be it"; after the repetition of the creed, "So is it." The Roman Catholic version of the New Testament (Rheims 1582), substitutes "Amen" for the "Verily" of our authorized version, it being the word used in the original Greek. The Mohammedans also use this word in their service.

AMENDMENT, in law, the correction of any mistake discovered in a writ or process.

In legislative proceedings, a clause, sentence, or paragraph proposed to be substituted for another, or to be inserted in a bill before Congress, and which, if carried, actually becomes part of the bill itself. As a rule amendments do not overthrow the principle of a bill.

In public meetings, a proposed alteration of the terms of a motion laid before a meeting for acceptance. This amendment may be so much at variance with the essential character of the motion that a counter motion would be its more appropriate name.

AMENEMHAT (am-en'em-hat), or *Amenemha*, the name of four Egyptian kings of the 12th dynasty. The first, called SEHOTEP-AB RA, the founder of the dynasty, reigned about 2466 B. C.; was successful as a ruler and general, and built the temple of Amun, in Thebes.

The second, called NUB-KAN RA, reigned in 2400 B. C. The third, called MAA-EN RA, reigned in 2300 B. C. He built a great reservoir in the oasis of Fayum, connected with the Nile by a canal in order to regulate the flow of the water and improve its usefulness. He built also, beside the Lake Mœris, the great temple called the Labyrinth and pyramid of his tomb. The fourth, called MAATKHERN RA, reigned 2266 B. C.

AMENHOTEP (am-en'hō-tep), or **AMENOPHIS**, the name of four Egyptian kings of the 18th dynasty. The first, SER-KA RA, reigned about 1666 B. C., and carried on successful wars in Ethiopia and Libya. The second, called AA-KHEPERU RA, reigned in 1566 B. C., and made a successful campaign in Asia. The third, the most famous, was the 9th of the 18th dynasty, known as MAAT-NEB RA, reigned about 1500 B. C. During his reign Egypt stretched from Mesopotamia to the country of Karo in Abyssinia. He also built along the banks of the Nile a series of marvelous monuments. The temple at Gebel-Barkal in the Sudan was erected by this King. He added considerably to the temple of Karnak and that part of the temple of Luxor which bears his name; also erected on the left bank of the Nile, opposite Luxor, a sacred edifice which once must have been one of the most important in Egypt, of which now only the enormous colossi are left, which are portrait statues of himself. He was known to the Greeks as Ammon. The fourth was known as KHUNATEN and reigned in 1466 B. C., and made an innovation in religion by substituting the new worship of Aten (the sun's disk) for that of Amun and other Egyptian deities. He also moved the capital from Thebes to a place in the middle of Egypt, the modern Tel-el Amarna.

AMERICA, the grand land division of the western hemisphere of the world, comprising North, Central, and South America, the West Indies and other adjacent islands. Although the indigenous inhabitants of the greater part of America display no family connection with the other races of the earth, the Eskimos of the Arctic regions are unquestionably of Mongolian origin. By many it is believed that the earliest discovery of America was by the Chinese. According to a circumstantial Chinese narrative, the voyager Hwui-Shan, at the end of the 5th century A. D., sailed 32,000 *li* E. to the Fu-Sang country. Moreover, students of the ancient Mexican and Peruvian civilizations find in them evidences of the imitation of Chinese institutions and practices.

The first European voyages to American shores were made by the Northmen, who, in the middle of the 10th century, discovered and colonized Greenland, and (about 1001) visited the coasts of New England, where they established settlements. In 1492 Columbus discovered the West Indies, and in 1498 the mainland of South America; the first navigator to reach the North American mainland was Cabot (1497). The circumstances of the origin of the name America are highly interesting. Amerigo Vespucci, a navigator of Florence, undertook four voyages across the Atlantic—in 1497, 1499, 1501, and 1503. He described his experiences in a series of letters, addressed to his friend Soderini, gonfalonier of Florence, and to other gentlemen. These letters were translated by Martin Waldseemüller, a German schoolmaster and cosmographer at St. Dié in Lorraine, and incorporated by him in a treatise, "Cosmographiæ Introductio," published in 1507. In his preface Waldseemüller proposed that "this fourth part of the world" should be called, after its discoverer, a man of sagacious mind, by the name of Amerigé—that is to say, the land of Americus or America, since both Europe and Asia have obtained the name of women." The mature judgment of historical specialists acquits Vespucci of any collusion or participation in the naming of America, and places the responsibility wholly upon the obscure Vosgian pedagogue. The two American continents, with their N. and S. islands, have a length of about 8,280 geographical miles, covering 138 degrees of latitude. Their extreme E. and W. points are separated by 131½ degrees of longitude. The combined area is estimated at 16,000,000 square miles; the population at 200,000,000.

AMERICAN FEDERATION OF LABOR. See LABOR, AMERICAN FEDERATION OF.

AMERICAN INDIANS. See INDIANS, AMERICAN.

AMERICANIZATION. This term was brought into general use during the organization of "Americanization Day" celebrations in a number of cities for July 4, 1915. It properly refers to the "science of race assimilation"—the process of making an American people out of the vast army of immigrants who have come from every nation of the world to seek homes in the United States. The term has consequently been applied somewhat indiscriminately to a wide variety of activities among the foreign born on the assumption that such programs con-

tribute to the process of race assimilation in America.

Interest in this fundamental problem of American democracy had been increasing for many years before such programs were designated "Americanization." The publication of the report of the United States Immigration Commission in 1911 marked the culmination of an attempt to formulate a constructive national policy toward immigration and naturalization and has been the basis of many of the programs adopted since.

Public interest in the foreign born was quickened by the outbreak of the Great War which revealed the intense nationalistic feeling of many foreign-born groups in America and their utter ignorance of and even estrangement from the daily life of the American people. This situation came to be seriously considered as a problem of national defense when it became clear that the United States would enter the conflict, and a systematic campaign of patriotic education among the foreign born was commenced at once by the Councils of National Defense, the United States Department of the Interior, the Food Administration and other Government agencies charged with the task of uniting the American people in support of the war aims of the nation. The emphasis was gradually shifted from emergency propaganda to a long-time educational program, when a study of conditions in the draft army made by the Surgeon-General's Office showed conclusively that from 18 per cent. to 42 per cent. of the men in army camps were unable to read a newspaper or to write a letter home, and that in the Northern and Middle Western States these illiterates were almost entirely foreign born whites. Indications were that barriers to any understanding of American aims and interests were even more marked than this among the older men and the women in the foreign colonies within America. The hole nation was aroused to the situation and hundreds of Americanization agencies sprang up overnight.

National Program.—The leadership in the national movement was assumed by Franklin K. Lane, Secretary of the Interior, who enlisted the co-operation of the National Council of Defense and the National Americanization Committee, through the Bureau of Education. In March, 1919, connection with the National Americanization Committee was severed and a Federal Division of Americanization, headed by Mr. Fred C. Butler, was organized as a part of the Bureau. Eleven "regional directors" represented the Washington division throughout the United States. Permanent financial support of this division was provided for in the Smith-Bankhead Americanization bill, but the failure of this measure to pass caused the discontinuance of the division at the close of 1919. Interest in Americanization legislation was again roused by the investigation of the steel strike in the fall of 1919 by the Education and Labor Committee of the Senate. This committee became convinced of the need of education of the adult foreign born and introduced the Kenyon bill which (amended) provided for an appropriation of $6,500,000 for the year 1920-1921 for the purpose of educating illiterates and non-English-speaking adults. This sum was to have been spent through the various States, on condition that each State should appropriate a sum equal to its share of the Federal grant and should make attendance at classes compulsory for illiterate and non-English-speaking persons from 16 to 45 years. The measure passed the Senate in January, 1920, but was not voted upon in the House.

Simultaneously with the Americanization program of the Department of the Interior, the Department of Labor, through its Bureau of Naturalization, has been active in stimulating a program of education in citizenship throughout the country, working through State and local boards of education, as well as through the courts and the industries.

State and City Programs.—Prior to the war, practically nothing had been done in the individual States toward developing a definite policy toward immigration. Notable exceptions to this rule were California and New York, where permanent Commissions on Immigration have been functioning for some years. During 1917 and 1918, thirty States organized Americanization committees—usually as a part of State Defense Council programs—and six had appointed State directors of Americanization. A large number of these States passed laws providing facilities for the education of adult immigrants; a few made attendance at school compulsory for non-English-speaking adults under 45. Most of these State committees went out of existence with the Defense Councils, but a number have been continued and developed, either as departments of State Divisions of University Extension (*e. g.*, Massachusetts, New York) or as separate departments, attached more or less closely to the State Boards of Education (*e. g.*, Connecticut Delaware, Maryland). A number of city Americanization committees survived the armistice and developed constructive programs. Outstanding features of typical

State and city programs follow:

(1) The drive against illiteracy (as in New York State, where the elimination of illiteracy has been adopted as a definite goal).

(2) Improvement of facilities for immigrant education (as in Massachusetts, New York, Connecticut, Delaware, Ohio, California, and other States, where teachers have been given special training, methods have been standardized, attendance stimulated, and definite studies of results made).

(3) Intensive training of aliens in constructive citizenship—particularly in Massachusetts, where standards have been greatly improved.

(4) Home classes for immigrant women—particularly in California, where teachers are paid by the State to teach groups of women in their own homes.

(5) Industrial classes in which immigrant workers are given lessons in English and citizenship in factories and shops, either on their own time, or on the employer's, or both. This work is usually run under private auspices, but is often under the direction of State or city educational authorities, as in Massachusetts, Connecticut, New York, Ohio, and other States.

(6) Prevention of exploitation of the immigrant, handled by private agencies in many States and cities, but an integral part of the Americanization programs of California, Massachusetts, New York, Delaware, and other States.

(7) Stimulation of self-expression of the foreign born and of mutual sympathy among all groups through pageants, parades, homeland exhibits, etc. This has been done by scores of city committees and notably by the New York State Division of University Extension.

(8) Recreational work and community organization. (Chiefly by city committees and boards of education, but sometimes as a part of a State program, as in Delaware.)

Private Organizations.—Huge sums have been raised by numerous religious and patriotic organizations for various activities among immigrants. In some instances the contribution made by these programs to the process of Americanization, or race assimilation, is necessarily subordinated to the special aims and interests for which these groups were organized; in other cases the work is exactly similar to the public programs outlined above. Among the religious groups carrying on systematic programs of work among immigrants are most of the larger Protestant denominations, the National Catholic War Council, the Y. M. C. A., the Y. W. C. A., the Knights of Columbus, the Y. M. H. A., and the W. C. T. U. Extensive campaigns have been conducted by such patriotic organizations as the National Security League, the Sons and Daughters of the American Revolution, and the Colonial Dames of America. The National Chamber of Commerce and hundreds of city chambers have done systematic and successful work. The National Federation of Women's Clubs and the National Council of Jewish Women have adopted definite and comprehensive programs of work. Incidentally, the contribution to the process of race assimilation made steadily for many years by the public libraries, countless social settlements, immigrant aid societies, and legal aid bureaus has been more widely recognized as the Americanization movement developed.

AMERICAN LEGION, an organization composed of members who served in the United States army or navy during the World War. It was incorporated Sept. 16, 1919, though it had been informally organized in Paris in the preceding March. The preamble to its constitution sets forth its objects as being "to uphold and defend the Constitution of the United States of America; to maintain law and order; to foster and perpetuate a hundred per cent. Americanism; to preserve the memories and incidents of our association in the Great War; to inculcate a sense of individual obligation to the community, state, and nation; to combat the autocracy of both the classes and the masses; to make right the master of might; to promote peace and good will on earth; to safeguard and transmit to posterity the principles of justice, freedom, and democracy; to consecrate and sanctify our comradeship by our devotion to mutual helpfulness." The legion aims to be non-political and not to promote candidacy of persons seeking public office. Its first national convention was held at Minneapolis, Minn., Nov. 10-11, 1919. Col. F. W. Gailbraith, national commander for 1921, was killed in an accident on June 9, 1921. John W. Emery, of Grand Rapids, Mich., was elected on June 14, 1921, to succeed F. W. Gailbraith. The national headquarters are in New York City.

AMERICAN PARTY, THE, the name of three separate organizations which at different times held a prominent place in the political affairs of the United States. The first, organized about 1852, at a time when the Whig party was near its dissolution was, in fact, a secret society, and was better known in later years as the "Know Nothings," from the assumed

ignorance of its members when questioned in regard to the objects and name of the order. Its principal doctrine was opposition to all foreigners and Roman Catholics, and its motto was "Americans must rule America." The first National Convention of the party was held in February, 1856, at which resolutions were adopted, demanding a lengthening of the residence necessary to naturalization, and condemning President Pierce's administration for the repeal of the Missouri Compromise. A number of the members withdrew because of the refusal to consider a resolution regarding the restriction of slavery. Millard Fillmore, of New York, was nominated for President, and Andrew Jackson Donelson for Vice-President, which nominations were subsequently indorsed by the Whig Convention. Fillmore carried but one State, Maryland. The party was successful in carrying the State elections in Rhode Island and Maryland in 1857, but never gained any popularity in the Western States. A second party, bearing the same name, but directly adverse to the first in that it was founded in opposition to secret societies, was organized for political purposes by the National Christian Association. The organization was completed and the name adopted at a convention in Syracuse, N. Y., in 1874. At Pittsburgh, June 9, 1875, a platform was adopted in which were demanded recognition of the Sabbath, the introduction of the Bible into public schools, prohibition of the sale of liquors, the restriction of land monopolies, resumption of specie payment, etc. James B. Walker of Illinois was nominated for President. In 1880, the party again made nominations, and in 1884, S. C. Pomeroy was nominated, but withdrew in favor of John P. St. John, the Prohibition candidate. The third party to be called by the name of American party was organized at a convention held at Philadelphia, Sept. 16-17, 1887. Its principal aims, as set forth in its platform, were: To oppose the existing system of immigration and naturalization of foreigners; to demand its restriction and regulation so as to make a 14-years' residence a prerequisite of naturalization; to exclude from the benefits of citizenship all anarchists, socialists, and other dangerous characters, etc.

AMERICAN PROTECTIVE ASSOCIATION, popularly known as the "A. P. A.," a secret order organized throughout the United States, with branches in Canada. Its chief doctrine is that "subjection to and support of any ecclesiastical power not created and controlled by American citizens, and which claims equal, if not greater, sovereignty than the Government of the United States of America, is irreconcilable with American citizenship"; and it accordingly opposes "the holding of offices in National, State, or Municipal Government by any subject or supporter of such ecclesiastical power." Another of its cardinal purposes is to prevent all public encouragement and support of sectarian schools. It does not constitute a separate political party, but seeks to control existing parties. The order was founded March 13, 1887, and at one time had 2,000,000 members. It has virtually died out.

AMERICAN PROTECTIVE LEAGUE. See PROTECTIVE LEAGUE, AMERICAN.

AMERICAN PSYCHOLOGICAL ASSOCIATION, an organization founded in 1892 for the advancement of psychology as a science. Office of Secretary, Smith College, Northampton, Mass.

AMERICAN SOCIAL SCIENCE ASSOCIATION, a society organized in 1865; meets annually in certain selected cities.

AMERICAN SOCIETY OF CIVIL ENGINEERS, an association instituted in 1852. Home, 29 W. 39th St., New York City. It has over 8,000 members.

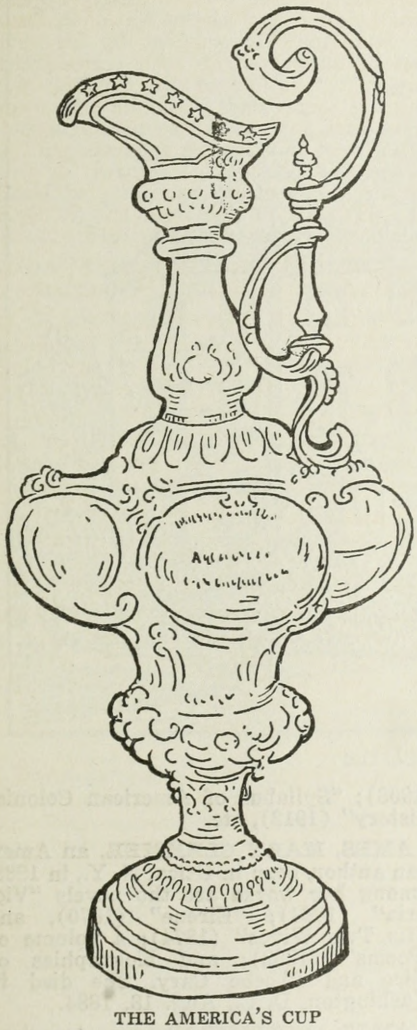
AMERICAN SOCIETY OF MECHANICAL ENGINEERS, an organization chartered in 1881. Home, 29 W. 39th St., New York City. Publishes "The Journal," a monthly. Maintains a library of 60,000 books and 10,000 pamphlets.

AMERICAN UNIVERSITY, THE, a coeducational post-graduate institution in Washington, D. C., founded under the auspices of the Methodist Episcopal Church in 1893. Chancellor, Bishop John W. Hamilton, LL. D.

AMERICAN UNIVERSITY UNION IN EUROPE, an association of American universities and colleges, founded in Paris, to meet the needs of their students and graduates in Europe for military or other service in the World War. During the war headquarters were maintained in Paris and London. The union provided a home with the privileges of a club to the students of the colleges affiliated with it. Most of the leading colleges of the United States were members of the union, which performed useful services during the war and after.

AMERICA'S CUP, a yachting trophy, originally known as the Queen's Cup, offered as a prize to the yachts of all nations by the Royal Yacht Squadron of Great Britain, in 1851. The first contest

for it was held Aug. 22 of that year, when it was won by the American yacht "America," whose owners deeded it in trust to the New York Yacht Club. The



THE AMERICA'S CUP

subsequent success of American yachts in keeping the cup caused it to become popularly known as the America's Cup. Since the first contest in 1851 there have been, at various intervals, 32 other contests, all of which, except one on Oct. 19, 1871, were won by American boats. The last five challenges coming from the Royal Ulster Yacht Club were represented by Sir Thomas Lipton and were sailed by four different boats of English design, "Shamrock I.," "II.," "III.," and "IV." His challenge of 1914, though accepted, could not be fought out on account of the war. It was renewed in October, 1919. A series of races, held off Sandy Hook in midsummer, 1920, between "Shamrock IV." and the American defender "Resolute," was won by the latter.

AMERICUS, a city of Georgia, the county-seat of Sumter co., about 70 miles S. W. of Macon. It is on the Central of Georgia and the Seaboard Air Line railroads. The center of an important agricultural region, it also has extensive industries, including cotton oil, fertilizer, and monument works. It is the seat of the State Agricultural College, and its important buildings include a library, large hotel, and a Y. M. C. A. building. Pop. (1910) 8,063; (1920) 9,010.

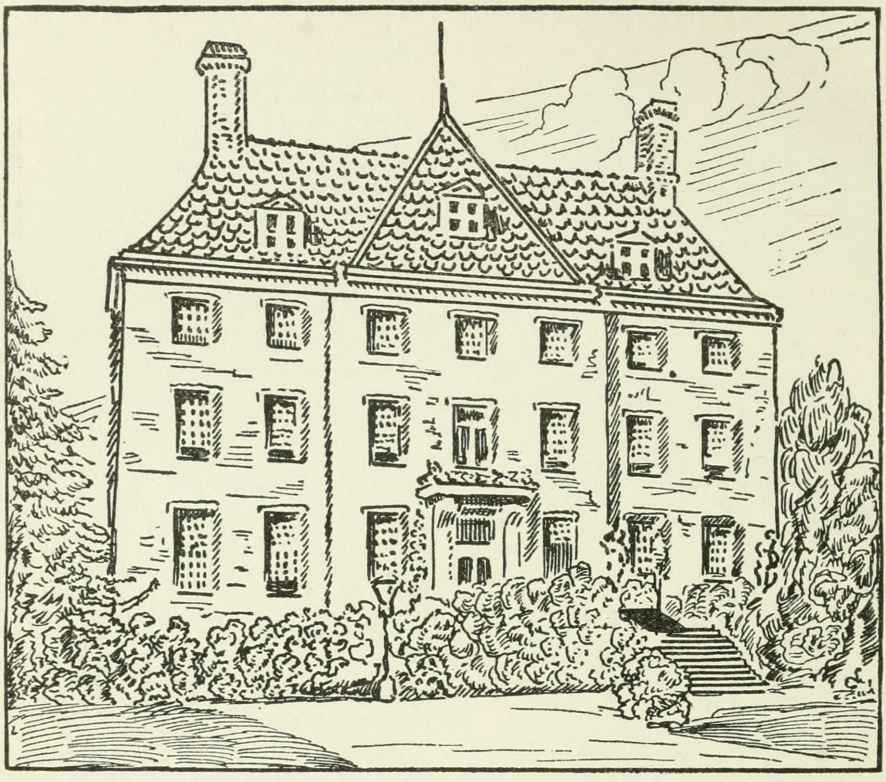
AMERONGEN CASTLE, the property of Count von Bentinck, Dutch nobleman, located in the village of the same name, 15 miles S. E. of Utrecht, near the frontier between Germany and Holland. It was the place to which the ex-Kaiser of Germany fled after his abdication. He left Spa on the night of Nov. 9, 1918, and reached Amerongen on the following day. There he remained until 1920, at which time he removed to an estate at Doorn near Utrecht, which he had purchased and furnished. Most of the time of the ex-royal fugitive was spent in cutting down trees on the Amerongen estate. He was joined there later by the German ex-Empress.

AMES, a city of Iowa, in Story co., 37 miles N. of Des Moines. It is on the Chicago and Northwestern railroad, and is the seat of the State College of Agriculture and Mechanic Arts. The city has a library and is of considerable industrial importance. Pop. (1910) 4,223; (1920) 6,270.

AMES, ADELBERT, an American military officer, born in 1835; graduated at West Point, 1861; became Brigadier-General and brevet Major-General United States Volunteers, in the Civil War; Provisional Governor of Mississippi, 1868; resigned army commission, 1870; United States Senator from Mississippi, 1870-1873, Governor 1874-1876; and Brigadier-General United States Volunteers in the war with Spain, 1898.

AMES, FISHER, an American orator and statesman, born in Dedham, Mass., April 9, 1758. Admitted to the bar in 1781, he became a member of Congress in 1789, where he gained a national reputation by his oratory. Two of his finest efforts were in support of John Jay's treaty with Great Britain and a eulogy on Washington before the Massachu-

setts Legislature. He was elected president of Harvard College in 1804, but declined. His work consists of orations, essays, and letters (2 vols., 1854). He died in Dedham, July 4, 1808.



AMERONGEN CASTLE

AMES, HERMAN VANDENBURG, an American educator, born in Lancaster, Mass., in 1865. He graduated from Amherst College in 1888 and took post-graduate courses in Columbia and Harvard Universities. After three years on the faculty of the University of Michigan, he studied at Leipsic and Heidelberg. In 1896 he became assistant professor of history in Ohio State University, and in the following year he was appointed instructor in American constitutional history at the University of Pennsylvania. In 1908 he was appointed professor of American constitutional history in the same institution and in 1907 he became dean of the Graduate School. He gave lecture courses in other colleges and was a member of many important historical societies. Among his popular writings are "Outline of Lectures on American Political and Institutional History during the Colonial and Revolutionary Periods" (1908); "Syllabus of American Colonial History" (1912), etc.

AMES, MARY CLEMMER, an American author, born in Utica, N. Y., in 1839. Among her works are the novels "Victoria" (1864); "Eirene" (1870), and "His Two Wives" (1874); a volume of "Poems" (1882); and biographies of Alice and Phoebe Cary. She died in Washington, D. C., Aug. 18, 1884.

AMES, WINTHROP, an American theatrical manager, born in Massachusetts in 1871. He graduated from Harvard University in 1895. After several years spent in editorial work and in magazine writing, he became manager of the Castle Square Theater in Boston in 1904. He was one of the chief movers in the plan to erect the New Theater in New York City and was its director from 1908 until the enterprise was abandoned in 1911. Afterward he was manager of several theaters in New York City and produced some of the most notable plays seen in recent years.

AMESBURY, a town in Essex co., Mass.; on the Merrimac river and the Boston and Maine railroad; 27 miles N. of Salem. It has manufactories of cotton and woolen goods, boots and shoes, machinery, carriages, etc., and was long the residence of the poet Whittier. Pop. (1910) 9,894; (1920) 10,036.

AMETABOLA, or AMETABOLIANS, a sub-class of insects, consisting of those which do not undergo metamorphosis. It includes three orders: the *anoplura*, or lice; the *mallophaga*, or bird-lice; and the *thysanura*, or spring-tails. All are wingless insects.

AMETHYST, a variety of quartz. Its color is clear purple or bluish violet; hence it is sometimes called violet-quartz. The coloring matter is generally believed to be manganese. The beauty and hardness of the amethyst cause it to be regarded as a precious stone. It occurs in veins or geodes in trappean and other rocks. The best specimens are brought from India, Armenia, and Arabia.

The Oriental amethyst is a rare purple variety of sapphire.

The last stone in the third row of the Jewish high-priest's breastplate was an amethyst (Exod. xxviii: 19); and the 12th foundation of the new Jerusalem, mentioned in Rev. xxi: 20, was to be an amethyst.

AMHERST, a town in Hampshire co., Mass.; on the Boston and Maine and the Central Vermont railroads; 23 miles N. N. E. of Springfield. It has manufactories of paper, straw and palm-leaf hats, leather, and children's wagons, and is best known as the seat of AMHERST COLLEGE (*q. v.*), the State Agricultural College, and the State Experiment Station. Pop. (1910), 5,112; (1920) 5,550.

AMHERST COLLEGE, an educational institution in Amherst, Mass.; founded in 1821 and incorporated in 1825. The members of the faculty in 1919 numbered 52, and the students 503. The productive funds amounted to $3,800,000, and the income to $300,000. President, Alexander Meiklejohn, Ph. D., LL. D.

AMHERST, JEFFERY, LORD, a distinguished British officer, born in 1717. He entered the army at an early age, and ultimately became Major-General. Sent over to America, he captured Louisburg, and followed it up by the reduction of Forts Duquesne, Niagara, and Ticonderoga, which paved the way for the entire conquest of Canada. In 1763, Amherst was made Governor of Virginia, and created Baron Amherst of Holmesdale in 1776. He was appointed Commander-in-Chief of the British army in 1778, in which capacity he took a most active, but humane, part in suppressing the London riots of 1780. Upon resigning his chief command in 1795 he was made a Field-Marshal. Died in 1798.

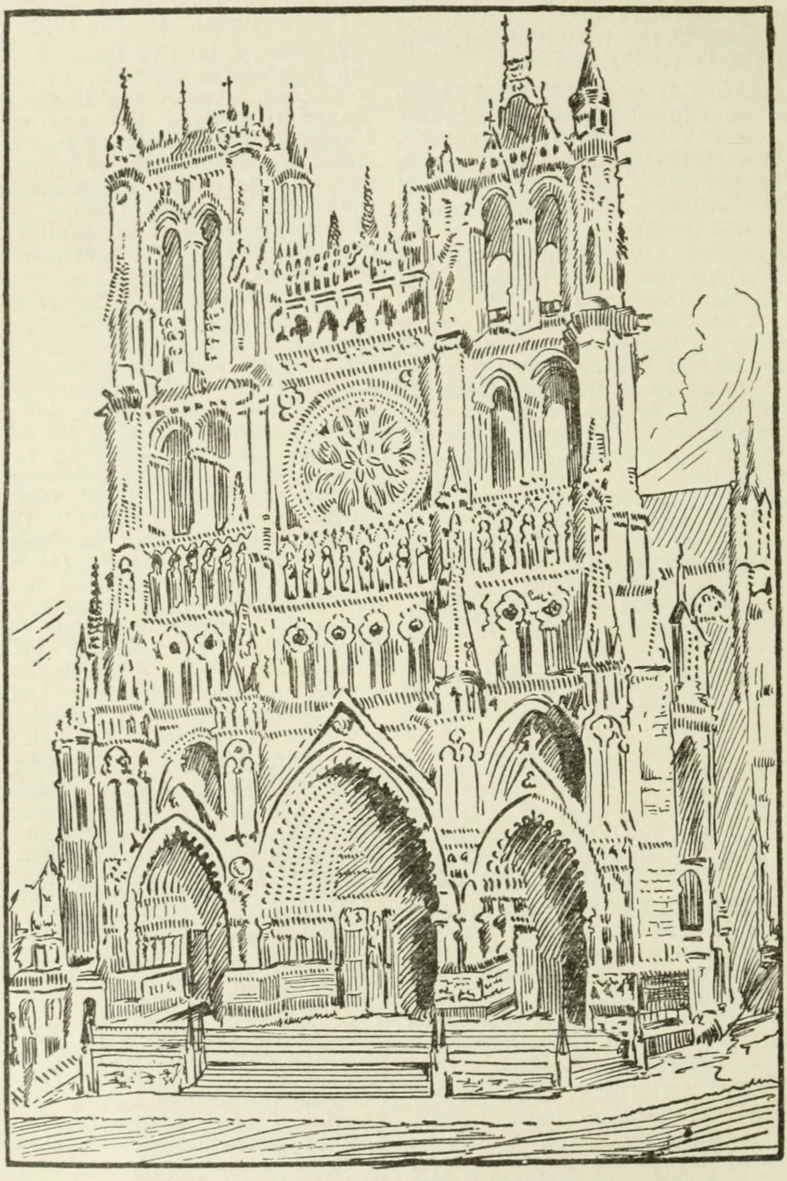
AMICA, a lake of South America, in the province of Cumana, Venezuela, on a plateau between the Rupumung and Tocoto rivers. In the age of Queen Elizabeth, the vicinity of this lake was called the El Dorado, and near it was supposed to stand the wonderful imperial city of Manoa, forming the object of the expedition of Sir Walter Raleigh and his ill-fated followers, but which they failed to discover.

AMICIS, EDMONDO DE (ä-mē'chēs), an Italian writer, born at Oneglia, in Liguria, Oct. 21, 1846. From 1865 till the occupation of Rome by the Italian army, he was in the military service of King Victor Emmanuel's Government; then he returned to civil life at Turin, devoting himself wholly to literature. Among his writings the most noteworthy are "Army Life" (1869), and "Recollections of 1870-1871." Of novels "The College Friends," "A Great Day," "The Paternal Home" (1872), and "Cuore" (Hearts), published in English as "The Heart of a Schoolboy." His works of travel—including "Spain," "Recollections of London," "Holland," "Constantinople," "Recollections of Paris," and "Morocco"—have had a very wide circulation. He has published also a volume of "Verses." He died in 1908.

AMIEL, HENRI FREDERIC, a distinguished Swiss essayist, philosophical critic, and poet, born at Geneva, Sept. 27, 1821. He became Professor of Philosophy in the Geneva Academy. He is author of several works on the history of literature, as "The Literary Movement in Romanish Switzerland" (1849); "Study on Mme. de Staël" (1878); and of several poems. But his fame rests principally on the "Journal." He died in Geneva, March 11, 1881.

AMIENS (äm-yan'), an old French city, the capital once of Picardy, and now of the department of Somme, on the many-channelled navigable Somme, 81 miles N. of Paris by rail. The Cathedral of Notre Dame is a masterpiece of Gothic architecture. Begun in 1220, it is 452 feet long, and has a spire (1529) 426 feet high; but its special feature is the loftiness of the nave, 141 feet. Other noteworthy buildings are the Hôtel de Ville (1600-1760), in which the Peace of Amiens was signed, the large museum (1864), in Renaissance style; and the public library, which was

founded in 1791, and contains 70,000 volumes. Amiens has considerable manufactures of velvet, silk, woolen, and cotton goods, ribbons, and carpets. Peter



CATHEDRAL AT AMIENS, FRANCE

the Hermit and Ducange were natives, and there are statues to both of them. The Peace of Amiens (March 27, 1802) was a treaty intended to settle the disputed points between England, France, Spain, and Holland. By it, England retained possession of Ceylon and Trinidad, and an open port at the Cape of Good Hope; the republic of the Ionian islands was recognized; Malta was restored to the Knights of St. John; Spain and Holland regained their colonies, with the exception of Trinidad and Ceylon; the French were to quit Rome and Naples; and Turkey was restored to its integrity. In the Franco-Prussian War,

on Nov. 27, 1870, General Manteuffél inflicted, near Amiens, a signal defeat on a French army 30,000 strong, and three days later the citadel surrendered. In the World War (1914-1918) it was a military center and railroad supply depot. It was an objective of the Germans in the last great drive in April, 1918, and narrowly escaped capture, but was badly damaged by German artillery fire. Pop. about 95,000.

AMMERGAU (am'er-gou), **OBER-** and **UNTER-**, two adjoining villages in Upper Bavaria, in the higher part of the valley of the Ammer, 42 miles S. W. by S. of Munich. Ober-Ammergau is noted for the performance of the "Passion Play," a series of dramatic representations of the sufferings of Christ. On the height near the theater is a colossal memorial of "Christ on the Cross, with Mary and John," modeled by Halbig, the gift of King Ludwig II. See PASSION PLAY.

AMMON, a god of the ancient Egyptians, worshipped especially in Thebes (No-Ammon), and early represented as a ram with downward branching horns, the symbols of power; as a man with a ram's head; and as a complete man with two high feathers on his head, bearded, sitting on a throne, and holding in his right hand the scepter of the gods, in his left the handled cross, the symbol of divine life. Ammon, his wife Mut (the mother), and his son Chensu, form the divine triad of Thebes. In Egyptian mythology he held his highest place. From about the time of the 21st dynasty, he came to be considered the god of oracles, and as such was worshipped in Ethiopia and in the Libyan desert. Twelve days' journey W. of Memphis, in the desert, was a green oasis fringed with a belt of palm trees, on which rose the temple of Ammon. Hither came pilgrims laden with costly presents; among them Alexander the Great and Cato of Utica. Alexander was hailed as the actual son of the god by the priests, quick to anticipate the wishes of the hero. The Persian conqueror, Cambyses, sent against the temple an expedition, which perished miserably in the sands. The worship of Ammon spread at an early period to Greece, and afterward to Rome, where he was identified with Zeus and Jupiter.

AMMONIA, a substance consisting of NH_3. Molecular weight, 17. Sp. gr. 8.5, compared with H; compared with air (1), its sp. gr. is 0.59. It is a colorless, pungent gas, with a strong alkaline reaction. The *liquor ammoniæ* of the pharmacopœia has a specific gravity of 0.959, and a fluid drachm contains 5.2 grains of NH_3. Ammonia is obtained by the dry distillation of animal or vegetable matter containing nitrogen; horns, hoofs, etc., produce large quantities; hence its name of spirits of hartshorn. Guano consists chiefly of urate of ammonia. But ammonia is now obtained from the liquor of gasworks, coal containing about 2 per cent. of nitrogen. Ammonia is formed by the action of nascent hydrogen on dilute acetic acid. Ammonia gas is prepared in the laboratory by heating together one part of NH_4Cl with two parts by weight of quicklime, and is collected over mercury. NH_3 is decomposed into N and H_3 by passing it through a red-hot tube, or by sending electric sparks through it; the resulting gases occupy twice the volume of the ammonia gas. It is used in medicine as an antacid and stimulant; it also increases the secretions. Externally, it is employed as a rubefacient and vesicant. Ammonia liniment consists of one part of solution of ammonia to three parts of olive oil. Ammonia is used as an antidote in cases of poisoning by prussic acid, tobacco, and other sedative drugs.

AMMONIACUM, a gum resin, called also gum ammoniac, which is imported into this country from Turkey and the East Indies in little lumps, or tears, of a strong and not very pleasing smell and a nauseous taste, followed by bitterness in the mouth. It is a stimulant, a deobstruent, an expectorant, an antispasmodic, a discutient, and a resolvent. Hence, it is internally employed in asthma and chronic catarrh, visceral obstructions, and obstinate colic, while it is used externally in scirrhous tumors and white swellings of the joints.

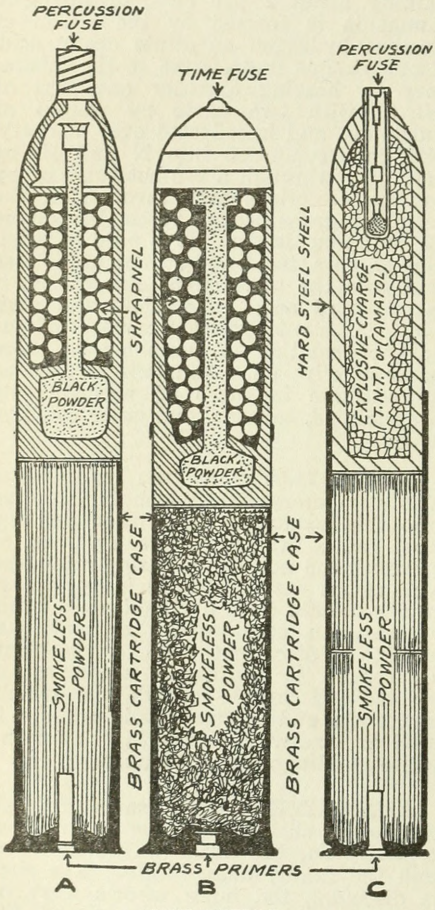
AMMONITE, a large genus of fossil chambered shells, belonging to the class *cephalopoda*, the order *tetrabranchiata*, and the family *ammonitidæ*. The shell is discoidal, the inner whorls more or less concealed, the septa undulated, the sutures lobed and foliated, and the siphuncle dorsal.

The ancients venerated them, as the Hindus still do. About 700 so-called species have been described, ranging from the trias to the chalk.

AMMONIUM, the name given by Berzelius to a supposed monatomic radical $(NH_4)'$.

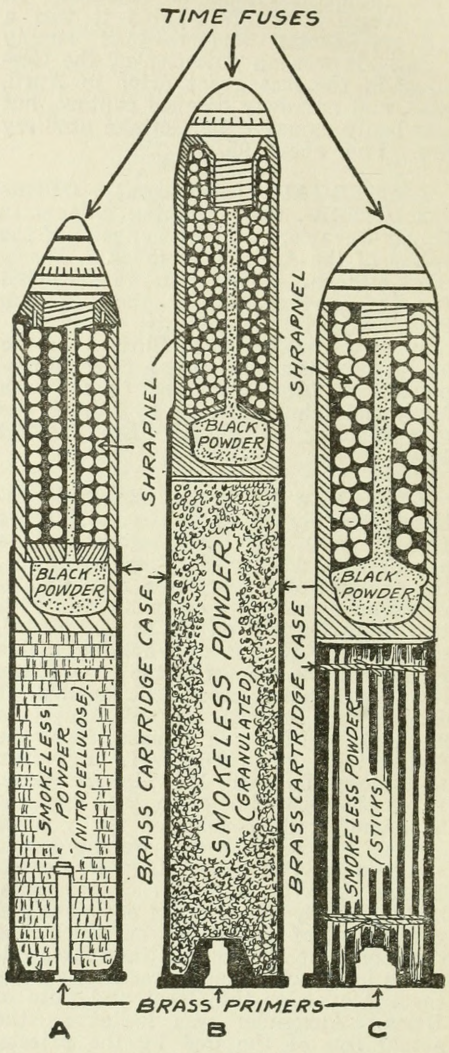
AMMUNITION, a term applied to the ordnance stores used in the firing of guns of every sort and caliber. The

term includes gunpowder, projectiles, primers, and accessories. The term "fixed ammunition" is applied to the condition when powder, projectile, or primer are combined in the single piece, so as to be ready for firing when placed in the gun. It is also employed in the case of ammunition for large guns, in which the powder is inclosed in a metallic case which is primed, but is loaded separately from the projectile. This type of ammunition is now seldom used. The ammunition used in heavy guns is almost always fixed for calibers of less than 4 inches. The metallic cartridge case employed for fixed ammunition is usually made of brass of the best quality stamped from sheets or plates of varying thickness. The cases have a rim or groove around the base which is seized by the extractor in removing the empty case after firing.



GUN SHELLS.

A. French 75 mm. Shrapnel Shell
B. British 13 Pounder Shrapnel Shell
C. United States High Explosive Shell



GUN SHELLS

A. United States 3″ Shrapnel Shell
B. Russian 3″ Shrapnel Shell
C. German 3.30 Shrapnel Shell

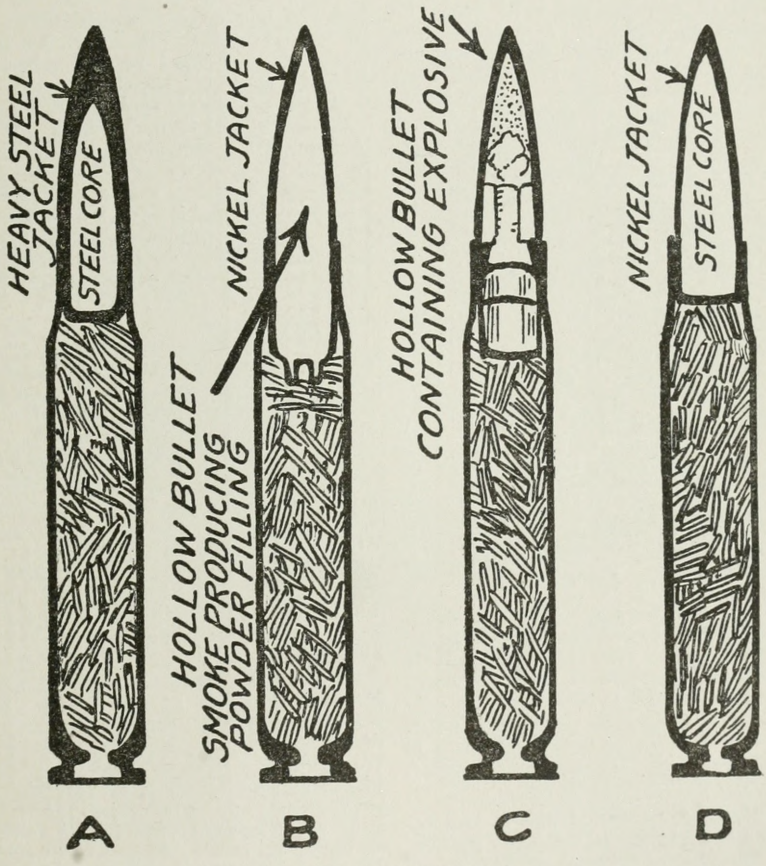
For guns of larger caliber, the propelling force, which is gunpowder, is inclosed in bags made of cloth. The charges are divided into sections when the weight of the complete charge is more than 100 pounds.

The charges are ignited by primers which are of four types: percussion, friction, electric, and percussion and electric combined. The ammunition sup-

ply for the army of the United States includes ammunition for small arms including rifles, machine guns, and pistols, and ammunition for the Field Artillery. In the United States the ammunition for the Field Artillery, prior to the World War, included the following calibers: 2.95-inch mountain gun, 3-inch field gun, and 3.8-inch field howitzers. In the case of these arms fixed ammunition is used.

The problem of continual and sufficient supply of ammunition is one of the most serious factors in war and was an especially difficult solution in the World War in which vast quantities of ammunition were expended. The supply is maintained by combat trains composed of ammunition wagons which accompany bodies of infantry and cavalry, and caissons which accompany artillery to the immediate neighborhood of the battle. Ammunition trains are held in the rear to insure a re-supply of combat trains.

The initial advantage obtained by Germany in the first years of the World War were to a large extent due to the immense store of ammunition which had been prepared and held in reserve. Thus these years resulted in an industrial as well as a military combat between Germany and the western Allies. The Entente Powers soon recovered from this disadvantage and by 1916 possessed the advantage in artillery and ammunition. This preponderance was even more marked in 1917 and continued



RIFLE AMMUNITION

A. Armor-Piercing .30 Caliber Rifle Cartridge
B. Tracer .30 Caliber Rifle Cartridge
C. Incendiary .30 Caliber Rifle Cartridge
D. Ordinary .30 Caliber Rifle Cartridge

throughout the war. The French output of projectiles for the 75 mm. field pieces had increased, by 1917, 40 times, compared with the output at the beginning of the war. The production of large-caliber projectiles had increased 90 times. The case of Great Britain was even more remarkable. The output in a single day of shells for heavy guns and in a week for field howitzer and 3-inch guns in 1917 equalled the production of these shells during the entire first year of the war. At this time there were nearly 5,000 Government-controlled ammunition plants in Great Britain, with over 2,000,000 employees.

The largest shells thrown during the World War were those fired from the long range cannon with which the Germans bombarded Paris. This gun had a range of 73 miles. The shell thrown weighed 330 pounds and had a bursting charge of 33 pounds. This was placed in two compartments separated by a metal diaphragm. The walls of the shell were very thick in order to withstand the shock of discharge. The total length was 4 feet, 2 feet 5 inches of which were ballastic cap to offset air resistance and cause the center of pressure to fall in advance of the center of gravity.

For discussion of the types of ammunition used in various types of ordnance, see ARTILLERY, MACHINE GUN, EXPLOSIVES, PROJECTILES, etc.

AMŒBA, a term applied to a protozoön which perpetually changes its form. It is classed under the rhizopoda. It is among the simplest living beings known, and might be described almost as an animated mass of perfectly transparent moving matter. The amœba diffluens is sometimes called, from its incessant changes of form, the proteus.

AMOMUM, a genus of plants belonging to the order *zingiberaceæ*, or gingerworts. They are natives of hot countries. The seeds of *A. granum paradisi*, *A. maximum*, and on the frontiers of Bengal of *A. aromaticum*, are the chief of the aromatic seeds called cardamoms. A pungent flavor is imparted to spirituous liquor by the hot acrid seeds of *A. angustifolium*, *macrospermum*, *maximum*, and *clusii*. It is also the specific name of the *sison amomum*, the hedge-bastard stone-parsley.

AMOS, one of the so-called minor prophets of the Hebrews, was a herdsman of Tekoa, in the neighborhood of Bethlehem, and also a dresser of sycamore trees. During the reigns of Uzziah in Judah, and Jeroboam II. in Israel (about 800 B. C.), he came forward to denounce the idolatry then prevalent.

AMOY, a seaport town and one of the treaty ports of China; on a small island of the same name in the province of Fukien; 325 miles E. by N. E. of Canton, and directly opposite the island of Formosa. It was one of the earliest seats of European commerce in China, the Portuguese having had establishments here in the 16th and the Dutch in the 17th centuries. In 1841 it was taken by the British, and, by the treaty of Nankin, a British consul and British subjects were permitted to reside here. This port is especially important in its relations to the prospective trade of the United States with China, and already its trade with the United States leads that of all other Chinese ports. During the international military operations in China, in 1900, the city was occupied by the Japanese. Pop. (1917) of port, 300,000; city, 114,000.

AMPERE, the practical unit of electric current strength. It is the measure of the current produced by an electro-motive force of one volt through a resistance of one ohm. In electric quantity it is the rate of one coulomb per second.

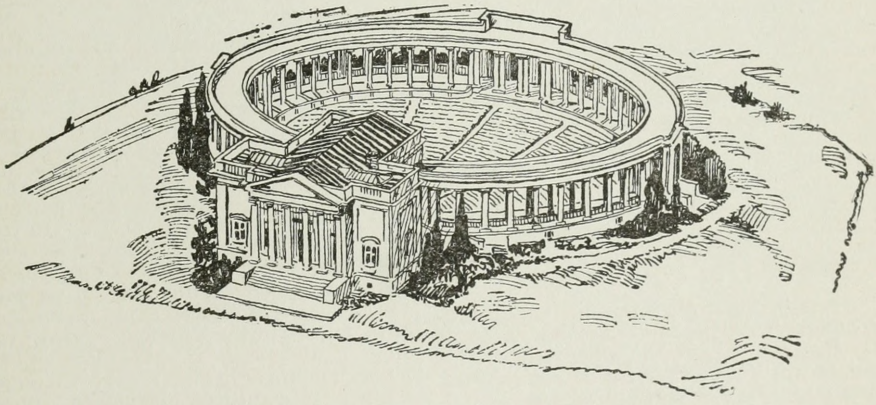
AMPÈRE, ANDRÉ MARIE (äm-pār'), a French mathematician and physicist, was born at Lyons in 1775. In 1805, after four years as a lecturer at Bourg and Lyons, he was called to Paris, where he distinguished himself as an able teacher in the Polytechnic School. In 1814 he became a member of the Academy of Sciences; in 1824 Professor of Experimental Physics in the Collége de France. He died at Marseilles, June 10, 1836. Scientific progress is largely indebted to Ampère, especially for his electro-dynamic theory, and his original views of the identity of electricity and magnetism, as given in his "Collection of Electro-Dynamic Observations" (1822), and his "Theory of Electro-Dynamic Phenomena" (1830).

AMPHIBIA, in zoölogy, animals which can live indiscriminately on land or water, or which at one part of their existence live in water and at another on land. It is used by Macleay, Swainson, Huxley, and other modern zoölogists for the fourth great class of animals corresponding to Cuvier's reptilian order *batrachia*. It is intermediate between *reptilia* and *pisces*. They have no amnion. Their visceral arches during a longer or shorter period develop filaments exercising a respiratory function, or branchiæ. The frog, the toad, and the newt are familiar examples of the *amphibia*.

AMPHIOXUS, a genus of fishes of an organization so humble, that the first specimen discovered was believed by Pallas to be a slug, and was described by him as the *limax lanceolatus*. It is now called *amphioxus lanceolatus*.

AMPHIPOD, in zoölogy, an animal belonging to the crustaceous order *amphipoda*.

AMPHITHEATER, a double theater. The ancient theaters were nearly semicircular in shape; or, more accurately, they were half ovals, so that an amphitheater, theoretically, consisting of two theaters, placed with their concavities meeting each other, was, loosely speaking, a nearly circular, or, more precisely, an oval building. Amphitheaters were first constructed of wood, but in the time of Augustus stone began to be employed. The place where the exhibitions took place was called the arena (Lat.=sand),



AMPHITHEATER IN THE NATIONAL CEMETERY AT ARLINGTON

because it was covered with sand or sawdust. The part next the arena was called podium, and was assigned to the emperor, the senators, and the ambassadors of foreign nations. Among the sights were combats of wild beasts and gladiator fights. The Romans built amphitheaters wherever they went. Remains of them are still to be found in various parts of Europe; but the most splendid ruins existing are those of the Coliseum at Rome. In recent years numerous elaborate amphitheaters have been built by some of the larger universities in the United States. These are used chiefly for athletic contests. Elaborate amphitheaters have also been erected as memorials, of which one of the finest examples is the amphitheater in the National Cemetery at Arlington.

AMPHITRITE (am-fē-trī'tē), a daughter of Oceanus and Tethys, or of Nereus and Doris. Neptune wished to make her his wife, and, as she hid herself from him, he sent a dolphin to find her, which brought her to him, and received as a reward a place among the stars.

AMPHORA, a two-handled vessel, generally made of clay, and used for holding wine, oil, honey, or even the skeletons or ashes of the dead.

It is also a liquid measure, containing 48 sectari, or nearly six gallons. The Greek *amphoreus* held nearly nine. The capacity of the Saxon *ambra* is unknown.

AMPUTATION, the cutting off of a part which, by its injured or diseased condition, endangers, or may endanger, the safety of the whole body. The amputation of a limb was in ancient times attended with great danger of the patient's dying during its performance, as surgeons had no efficient means of restraining the bleeding. The desired power of controlling the hemorrhage was obtained by the invention of the tourniquet in 1674, by a French surgeon, Morel, and its improvement early in the next century by his countryman Petit. The ancient surgeons endeavored to save a covering of skin for the stump, by having the skin drawn upward by an assistant, previously using the knife. In 1679 Lowdham of Exeter suggested cutting semicircular flaps on one or both sides of a limb, so as to preserve a fleshy cushion to cover the end of the bone. Both these methods are now in use, and are known as the "circular" and the "flap" operations; the latter is most frequently used in this country.

The question when amputation of a limb is necessary, is often, especially after an accident, one of the most difficult in surgery. The chief indications

for it in these cases are—very extensive destruction or laceration of the skin; injury to the large vessels or nerves; severe splintering of the bones. The diseases most commonly requiring it are—disease of bones or joints, especially when the discharge from it threatens to exhaust the patient; tumors, especially cancer and sarcoma, which cannot otherwise be removed; and gangrene.

AMRITSAR, or **UMRITSIR**, a well-built city of the Punjab, 32 miles E. of Lahore by rail. It is the religious metropolis of the Sikhs, a distinction which, along with its name (literally, "pool of immortality"), it owes to its sacred tank, in the midst of which stands the marble temple of the Sikh faith. Founded in 1574, but all of it more recent than 1762, it is, next to Delhi, the richest and most prosperous city in northern India, with manufactures of cashmere shawls, cotton, silks, etc. The huge Govindgarh, or fortress, is the most prominent feature of Amritsar. Pop. about 150,000.

AMSTERDAM ("dam" or "dike of the Amstel"), the capital of the Netherlands, is situated at the influx of the Amstel to the Ij or Y (pronounced eye), an arm (now mostly drained) of the Zuyder Zee, 44¾ miles N. N. E. of Rotterdam by rail. It is divided by the Amstel and numerous canals into a hundred small islands, connected by more than 300 bridges. Almost the whole city, which extends in the shape of a crescent, is founded on piles driven 40 or 50 feet through soft peat and sand to a firm substratum of clay. At the beginning of the 13th century it was merely a fishing village, with a small castle, the residence of the Lords of Amstel. In 1296, on account of its share in the murder of Count Floris of Holland, the rising town was demolished; but in 1311, with Amstelland (the district on the banks of the Amstel), it was taken under the protection of the Counts of Holland. In 1482 it was walled and fortified. After the revolt of the seven provinces (1566), it speedily rose to be their first commercial city, a great asylum for the Flemish Protestants; and in 1585 it was considerably enlarged by the building of the new town on the W. The establishment of the Dutch East India Company (1602) did much to forward the well-being of Amsterdam. In the middle of that century the war with England nearly ruined the commerce of the port. Amsterdam had to surrender to the Prussians in 1787, to the French in 1795; and the union of Holland with France in 1810 entirely destroyed its foreign trade. In 1815 commerce again began to expand—an expansion greatly promoted by the opening in 1876 of the new and more direct waterway between the North Sea and the city.

The city has a fine appearance when seen from the harbor, or from the high bridge over the Amstel. Church towers and spires, and a perfect forest of masts, relieve the flatness of the prospect. The three chief canals—the Heerengracht, Keizersgracht, and Prinsengracht—run in semi-circles within each other, and are from two to three miles long. The defenses of Amsterdam now consist in a row of detached forts, and in the sluices, several miles distant from the city, which can flood, in a few hours, the surrounding land. Pop. (1917) 640,993.

The chief industrial establishments are sugar refineries, engineering works, mills for polishing diamonds and other precious stones, dockyards, manufactories of sails, ropes, tobacco, silks, gold and silver plate and jewelry, colors, and chemicals, breweries, distilleries, with export houses for corn and colonial produce; cotton-spinning, book-printing, and type-founding are also carried on.

The former Stadhuis ("townhouse"), converted in 1808 into a palace for King Louis Bonaparte, and still retained by the reigning family, is a noble structure. It was built by Van Kampen in 1648-1655. It has a hall, 120 feet long, 57 wide, and 90 high, lined with white Italian marble—an apartment of great splendor. The cruciform *Nieuwe Kerk* (New Church), a Gothic edifice of 1408-1414, is the finest ecclesiastical structure in the city, with a splendidly carved pulpit, and the tombs of Admiral de Ruyter, the great Dutch poet Vondel, and various other worthies. The Old Church (*Oude Kerk*), built in the 14th century, is rich in painted glass, has a grand organ, and contains several monuments of naval heroes. Literature and science are represented by a university, by academies of arts and sciences, by museums and picture galleries, a palace of national industry, a botanical garden, etc. The new Rijksmuseum contains a truly national collection of paintings, its choicest treasure being Rembrandt's "Night-guard." REMBRANDT (*q. v.*), made Amsterdam his home; and his statue (1852) now fronts the house he occupied. Spinoza was a native. The North Holland canal, to which Amsterdam is so largely indebted for the rapid increase of its commerce, is noticed under ZUIDER ZEE.

In the European War, Amsterdam became a most flourishing port, as all the trade that formerly went to Antwerp came here while the Belgian city was in German hands.



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THE ALPS—MONT BLANC AND THE MER DE GLACE



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CREST OF THE CORDILLERAS, OR ANDES MOUNTAINS, AS SEEN ABOVE THE EVENING MIST BELT FROM SANTIAGO, CHILE



©*Photo by Ewing Galloway*

THE STARS AND STRIPES AND THE UNION JACK SIDE BY SIDE AT THE BOUNDARY LINE BETWEEN ALASKA AND CANADA.



©*Brown & Dawson*

TOTEMS AT SITKA. THESE ARE HISTORY AND GRAVE MONUMENTS



©Keystone View Company

A PARTY IN THOMPSON'S PASS, VALDEZ TRAIL, ALASKA



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APRICOTS, LARGELY GROWN IN CALIFORNIA, OREGON, AND NEW YORK STATE



©Photo, Gifford Studio

AN APPLE ORCHARD IN BLOSSOM IN THE HOOD RIVER VALLEY, OREGON, WITH MT. HOOD IN THE DISTANCE



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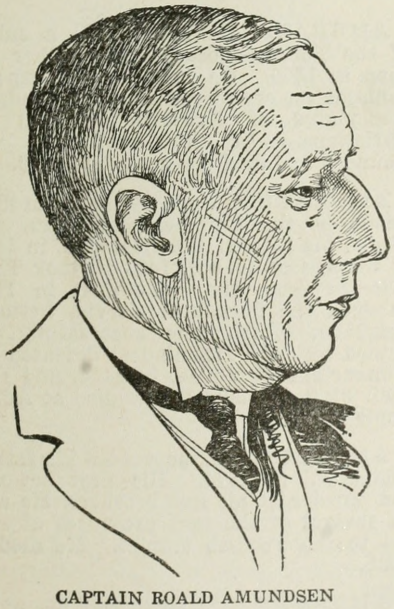
THE CHRIST OF THE ANDES

AMSTERDAM, a city of Montgomery co., N. Y.; on the Mohawk river and the New York Central and Hudson river and the West Shore railroads; 33 miles N. W. of Albany. It is an agricultural region, but is noted for its manufactures, especially of knit goods, carpets, steel springs, and paper, Pop. (1910) 31,267; (1920) 33,524.

AMSTERDAM, UNIVERSITY OF, an institution for higher learning in the city of Amsterdam, Holland, founded in 1632. It was reorganized in 1867 and ten years later was made the Royal University. It has faculties of law, medicine, mathematics, science, arts, and theology, and about 1,100 students.

AMULET, anything hung around the neck, placed like a bracelet on the wrist, or otherwise attached to the person, as an imagined preservative against sickness, witchcraft, or other evils, amulets were common in the ancient world, and they are so yet in nations where ignorance prevails.

AMUNDSEN, ROALD, a polar explorer, born at Borge, Norway, July 16, 1872. He studied medicine for two years in the University of Christiania. The



CAPTAIN ROALD AMUNDSEN

call of the sea, however, made itself felt, and he became a member of the Norwegian navy. His first seagoing experience dates from 1893. Four years later he was made first officer of one of the vessels of the South Polar expedition. This cruise covered the period 1897-1899, and determined his future career. In 1903 he undertook an expedition in a small vessel, the "Gjoa," with the design of relocating the magnetic North Pole. For more than a year and a half he surveyed an extensive district in the regions about the Pole, and gathered data which proved invaluable to him in his subsequent work. He was the first man to thread the Northwest Passage from the Atlantic to the Pacific. On Aug. 13, 1905, he reached Herschel Island. His desire to discover the Pole remained unabated, and he was planning an expedition with this in view, when Peary's discovery of the Pole was announced to the world. There remained, however, the field of Antarctic exploration, and he determined if possible to rival Peary's discovery by reaching the South Pole. When he started out, it was generally believed that he was aiming for the Arctic, and it was only when his vessel reached Madeira that he disclosed the real goal of his expedition. He reached the Bay of Whales on Jan. 14, 1911. Nearly a year was spent at this base, before he was ready to make the final dash for the South Pole. When at last his preparations were completed in October, 1911, he took four companions and started for the Pole, which he reached Dec. 16, 1911. Had he waited a month longer, the laurels of the discovery would have fallen to his English competitor, Captain Scott. While Amundsen was favored by weather conditions, this detracted no whit from the greatness of his achievement, which called into play all his native qualities of daring and persistence. The story of his adventures was told in lectures after his return, and embodied in a book, entitled "The South Pole" (1912).

Shortly afterward he planned a trip to the Arctic regions, and the project was well under way, $40,000 having been appropriated by the Norwegian Government for the purpose, when the outbreak of the World War made a postponement necessary. On June 28, 1918, Amundsen, with a crew of eight men and carrying with him two airplanes, set sail on the "Maude" from Christiania for the Arctic Circle. On Sept. 1 he took on oil and supplies at Dixon Island in the White Sea, north of Russia, and sailed northeast. He then pushed east along the north coast of Siberia, until his ship became embedded in the ice floes. This was what he desired, for he believed that the ship would be carried by the floes around the northern end of Nova Zembla and from there to the Liakoff Islands on the northern coast of Siberia. From that time no word of the expedition came

from the Arctic silences until March 25, 1920. Then a wireless message from Amundsen was picked up at Cordova, Alaska, from the radio station on St. Paul's Island, which reported that the expedition was icebound in the Kolyma river. No details were given as to the experiences or discoveries of the party, but it was gathered that the attempt to sail farther north had been abandoned, and that Amundsen was contemplating a return to the United States. It was understood that the object of his expedition had been not to reach the North Pole, but to explore the deep sea that covered the polar circle, to take soundings to determine the shape of the bottom, the temperature and direction of the winds, and other meteorological data. See ARCTIC AND ANTARCTIC EXPLORATIONS.

AMUR (am-ör'), a river formed by the junction (about 53° N. lat., and 121° E. long.) of the Shilka and the Argun, which both come from the S. W.—the former rising in the foothills of the Yablonoi Mountains. From the junction, the river flows first from S. E. and then N. E., and, after a total course of 2,500 miles, falls into the Sea of Okhotsk, opposite the island of Sakhalin. Its main tributaries are the Sungari and the Ussuri, both from the S. Above the Ussuri, the Amur is the boundary between Siberia and Manchuria; below it the river runs through Russian territory. It is very valuable for navigation, and carries a considerable fleet of steamers. The river is frozen for six months of the year; in summer there are extensive inundations.

From as early as 1636, Russian adventurers made excursions into the Chinese territories of the lower Amur. In 1854-1856 two military expeditions were conducted by Count Muravieff, who twice descended the river, unopposed by the Chinese, and established the stations of Alexandrovsk and Nikolaevsk. In 1858 China agreed to the Treaty of Tientsin, by which the boundaries of Russia and China were defined. The left bank of the Amur, and all the territory N. of it, became Russian; and below the confluence of the Ussuri, both banks. In 1860, after the occupation of Pekin by the British and French, General Ignatieff secured the signature of Prince Kung to a treaty, by which Russia acquired the broad and wide territory comprised between the river Amur and the mouth of the Tumên, extending 10° of latitude nearer the temperate regions, and running from the shore of the North Pacific eastward to the banks of the river Ussuri, a principal affluent of the Amur. In September, 1900, Russia took formal possession of the right bank of the river.

This vast territory was divided into two Russian provinces—the Maritime province between the Ussuri and the sea, and the government of Amur, N. of the river. The latter has an area of 175,000 square miles. Pop. about 250,000. The country is richly timbered, and is admirably adapted for pasturage and agriculture. Fur bearing animals are still plentiful, and the river abounds in fish. The capital is Blagovestschensk. Nikolaevsk, once the only important place in these regions, is on the Amur, 26 miles from its mouth, where the river is 1¼ miles wide, and in places 15 feet deep; but the political center tends southward to the more temperate maritime province (area, 730,000 square miles), near the southern end of which is situated the important harbor of Vladivostok ("Rule of the East"), or Port May, which, in 1872, was placed in telegraphic communication with Europe by the China submarine cable, and is now the capital of the Amur provinces. As a result of the World War and the Russian revolution the political future of the region is doubtful. Japan has made steady inroads, but may not be able to maintain herself eventually.

AMURATH I. (am-ö-rät'), a sultan of the Turks; succeeded his father Orchan in 1360. He founded the corps of Janissaries, conquered Phrygia, and, on the plains of Kossovo, defeated the Christians. In this battle he was wounded and died the next day, 1389.

AMURATH II., one of the more illustrious of the Ottoman emperors, succeeded his father, Mohammed I., in 1421, at the age of 17. In 1423 he took Thessalonica from the Venetians; in 1435, subdued the despot of Servia, besieged Belgrade, which was successfully defended by John Hunniades; defeated the Hungarians at Varna, in 1444, and slew their king, Ladislaus. He died at Adrianople in 1451.

AMURATH III., succeeded his father, Selim II., in 1574. His first act was the murder of his five brothers. He added several of the best provinces of Persia to the Turkish empire. He died in 1595.

AMURATH IV., succeeded his uncle. Mustapha X., 1623. After two unsuccessful attempts he took Bagdad from the Persians in 1638, and ordered the massacre of 30,000 prisoners who had surrendered at discretion. He died in 1640.

AMYGDALIN ($C_{20}H_{27}NO_{11}3H_2O$), a crystalline principle existing in the kernel of bitter almonds, the leaves of the prunus laurocerasus, and various other plants, which, by distillation, yield hydrocyanic acid. It is obtained, by extraction with boiling alcohol, from the paste or cake of bitter almonds, which remains after the fixed oil has been separated by pressure. When obtained pure, it has a sweetish, somewhat bitter taste, and is not poisonous, and, when treated with alkaline solvents, ammonia is expelled, and amygdalic acid, $C_{20}H_{26}O_{12}$, is produced.

AMYGDALOID, an igneous crystalline, or, as the case may be, vitreous rock (lava), containing numerous cells, which owe their origin to the segregation and expansion of steam, with which all lavas are more or less charged at the time of their eruption. The cells vary in size from mere pores up to cavities several inches, or even feet, in diameter. The cells are generally flattened or drawn out in the direction of flow of the lava, and are frequently filled with mineral matter (amygdules), subsequently introduced by infiltrating water. This is the origin of many of the agates and so-called "Scotch pebbles" of jewelers.

AMYGDALUS (am-ig'dal-us), a genus of plants belonging to the order *drupaceæ*, or almond-worts. It contains, among other species, the common peach, *amygdalus persica*, with the nectarine (variety nectarina), the almond, *amygdalus communis*, with the variety *amara*, or bitter almond.

AMYL (C_5H_{11}), the fifth in the series of alcohol radicals whose general formula is $C_nH_{2n}+_1$, and of which methyl and ethyl are the first two members. It has an agreeable smell and burning taste. It enters into a large number of chemical compounds, most of which—as, for instance, bromide, chloride, iodide, etc.—are derived from amylic alcohol, which bears precisely the same relation to amyl that ordinary alcohol bears to ethyl, C_2H_6.

AMYL, NITRITE OF ($C_5H_{11}NO_2$), a valuable drug which must not be confounded with nitrate of amyl, may be prepared by the action of nitric acid on fusel oil (amylic alcohol). It is a very powerful remedy in all convulsive diseases, and is of especial value in angina pectoris, as well as in asthma. Owing to its volatile nature it is usually kept in small glass or composition globes containing from two to five drops, one of which, when crushed in the handkerchief, and the vapor breathed, will often give immediate relief.

AMYLOID, a term used both in chemistry and botany, and generally equivalent to "starchy." Amyloids are substances like starch, dextrine, sugar, gum, etc., which consist of carbon, hydrogen, and oxygen. The animal body, chemically considered, is a mixture of proteids, amyloids or carbohydrates, and fats, plus water and mineral constituents, and the normal food always contains these constituents. Of the three items, proteids are, however, absolutely essential, amyloids and fats only desirable accessories. A compound radical called amyl is formed by the decomposition of starch in a peculiar fermentation—the amylic fermentation.

AMYRIDACEÆ (am-er-ē-das'ē-ī), an order of exogenous plants. The *amyridaceæ* have a panicled inflorescence, hypogynous stamina, double the petals in number, the fruit sub-drupaceous, samaroid, or leguminous, with from one to two seeds, the leaves abounding in resin. They occur in the tropics of India and America, in the latter region extending as far N. as Florida.

ANABAPTISTS, members of a well-known sect, which largely figured in the ecclesiastical and civil history of the 16th century. It began to attract notice within four years of the ever-memorable 31st of October, 1517, on which Luther affixed his "theses" to the gate of the castle church of Wittenberg. The most eminent of its early leaders were Thomas Münzer, Mark Stubner, and Nicholas Storck. They had been disciples of Luther; but, becoming dissatisfied with the moderate character of his reformation, they cast off his authority, and attempted more sweeping changes than he was prepared to sanction. During his absence, they, in 1521, began to preach their doctrines at Wittenberg. Laying claim to supernatural powers, they saw visions, uttered prophecies, and made an immense number of proselytes. In 1525, the peasants of Suabia, Thuringia, and Franconia, who had been much oppressed by their feudal superiors, rose in arms. The Anabaptists cast in their lot with the insurgent peasantry, and became their leaders in battle. After a time the allied princes of the empire, led by Philip, Landgrave of Hesse, put down the rebellion, and Münzer was defeated, captured, and ultimately beheaded. In 1532, some extreme Anabaptists from Holland, led by a baker called John Matthias, and a tailor, John of Leyden, seized on the city of Münster, in Westphalia, with the view of setting up in it a spiritual kingdom. The name was changed to Mount Zion and Matthias became its

actual king. On June 24, 1535, the Bishop of Münster retook the city by force of arms, and John of Leyden, who had succeeded Matthias, was put to death. It was in 1534, when John of Leyden was in the height of his glory in Münster, that Ignatius Loyola took the first step toward founding the Order of the Jesuits.

ANABLEPS, a genus of abdominal fishes, of the order *malacopterygii abdominales*, belonging to the family *cyprinidæ* (carps). Their eyes greatly project, and, moreover, seem, but only seem, as if divided into two; hence the species is called *anableps tetrophthalmus*. It is found in the rivers of Guiana.

ANACONDA, a city of Montana, the county-seat of Deer Lodge co. It is 26 miles N. W. of Butte, and is on the Butte, Anaconda and Pacific, the Chicago, Milwaukee and St. Paul, and the Northern Pacific railroads. It is in the midst of an important mining region and in it are located the largest copper smelting works in the world. There are also deposits of gold, lead, and silver in the vicinity. Other industries are brass and iron foundries, machine shops, brick works, etc. There are several parks, a library, opera house, and a race track. Pop. (1910) 10,134; (1920) 11,668.

ANACORTES, a city of Washington, in Skagit co., about 90 miles N. of Seattle. It is on the Great Northern railroad, and is a port of call for boats of the Inland Navigation Co., the Pacific Coast Steamship Co., the Alaska Pacific S. S. Co., and the Island Navigation Co. The city has important industries, including lumber mills, salmon canneries, box factories, shipyards, etc. There are two parks and a library. Pop. (1910) 4,168; (1920) 5,284.

ANACREON (a-nak'rē-on), a renowned lyric poet of Greece, born at Teos in Ionia, 562 B. C. He enjoyed the patronage of Polycrates, autocrat of Samos; and, while at his court, composed most of the odes in praise of wine and women which won for him pre-eminence among singers. A few of his authentic compositions have come down to us. He died 477 B. C.

ANADYR (an-ä'der), the most easterly of the larger rivers of Siberia and of all Asia; rises in the Stanovoi Mountains, and falls into the Gulf of Anadyr; length, 600 miles.

ANÆMIA, bloodlessness; a morbid state of the system produced by loss of blood, by deprivation of light and air in coal mines, or causes more obscure. The patient is characterized by a great paleness, and blood vessels, easily traceable at other times, become unseen after great hemorrhage, or in cases of anæmia.

ANÆSTHESIA (Greek, "lack of sensation"), a term used to express a loss of sensibility to external impressions, which may involve a part of the whole surface of the body. It may occur naturally as the result of disease, or may be produced artificially by the administration of anæsthetics.

In ancient writers, we read of insensibility or indifference to pain being obtained by means of Indian hemp (cannabis indica), either smoked or taken into the stomach. The Chinese, more than 1,500 years ago, used a preparation of hemp, or ma-ya, to annul pain. The Greeks and Romans used mandragora for a similar purpose (poiein anaisthesian); and, as late as the 13th century, the vapor from a sponge filled with mandragora, opium, and other sedatives was used. In 1784, Dr. Moore, of London, used compression on the nerves of a limb requiring amputation, but this method was in itself productive of much pain. In 1800, Sir Humphrey Davy, experimenting with nitrous oxide or laughing-gas, suggested its usefulness as an anæsthetic; and in 1828 Dr. Hickman suggested carbonic acid gas. As early as 1795, Dr. Pearson had used the vapor of sulphuric ether for the relief of spasmodic affections of the respiration. The fact that sulphuric ether could produce insensibility was shown by the American physicians, Godwin (1822), Mitchell (1832), Jackson (1833), Wood and Bache (1834); but it was first used to prevent the pain of an operation in 1846, by Dr. Morton, a dentist of Boston. The news of his success reached England on Dec. 17, 1846; on the 22d, Mr. Robinson, a dentist, and Dr. Liston, the eminent surgeon, operated on patients rendered insensible by the inhalation of sulphuric ether. This material was extensively used for a year, when Sir J. Y. Simpson, of Edinburgh, discovered the anæsthetic powers of chloroform and introduced the use of it into his special department, midwifery. Since that time, chloroform has been the anæsthetic in general use in Europe, but ether is preferred in the United States. Other substances have been used by inhalation, such as nitrous oxide gas, which is the best and safest anæsthetic for operations that last only one or two minutes, as in the extraction of teeth; bichloride of methylene and tetrachloride of carbon have also been employed.

Local anæsthesia, artificially produced, is of great value in minor operations,

and in painful affections of limited areas of the body. It depends upon a paralysis of the sensory nerves of the part, and may be induced by the application of cold, or of medical agents. Of medical agents the best is cocaine, prepared from the coca shrub of Peru (*erythroxylon coca*). Eucaine, thymol, menthol, aconite, belladonna, chloroform (the last three as the well-known A. B. C. liniment), phenol, chloral, and Indian hemp, have also a local anæsthetic action if rubbed on the skin, or applied to abraded surfaces, but most are too irritating to be of any great value.

ANAGNI (an-än'yē), a town of Italy, on a hill, 40 miles E. S. E. of Rome. The seat of a bishop since 487, it has an old, but much modernized cathedral, and was the birthplace of four popes—Innocent III., Gregory IX., Alexander IV., and Boniface VIII. The chief city of the Hernici, it was a place of importance during the whole period of Roman history. Vergil calls it "wealthy Anagnia." Pop. about 10,000.

ANAHEIM, a city of California, in Orange co., about 27 miles S. E. of Los Angeles. It is on the Southern Pacific and the Atchison, Topeka and Santa Fé railroads. The center of an important fruit-growing country, it has also important trade interests in oil, oranges, farm and dairy products. Pop. (1910) 2,628; (1920) 5,526.

ANALOGY, similitude of relations between one thing and other. The thing to which the other is compared is preceded by *to* or *with*. When both are mentioned together they are connected by the word *between*.

In logic, the resemblance of relations, a meaning given to the word first by the mathematicians.

As more commonly used it is a resemblance of any kind on which an argument falling short of induction may be founded. If an invariable conjunction is made out between a property in the one case and a property in the other, the argument rises above analogy, and becomes an induction on a limited basis; but if no such conjunction has been made out, then the argument is one of analogy merely. Metaphor and allegory address the imagination, while analogy appeals to the reason. The former are founded on similarity of appearances, of effects, or of incidental circumstances; the latter is built upon more essential resemblances, which afford a proper basis for reasoning.

In biology, an analogy is the relation between parts which agree in function, as the wing of a bird and that of a butterfly, the tail of a whale and that of a fish.

ANALYSIS, in ordinary language, the act of analyzing; the state of being analyzed; the result of such investigation. The separation of anything physical, mental, or a mere conception into its constitutent elements. It is also applied to a syllabus, conspectus, or exhibition of the heads of a discourse; a synopsis, a brief abstract of a subject to enable a reader more readily to comprehend it when it is treated at length.

In mathematics, the term analysis, signifying an unloosing, as contradistinguished from synthesis=a putting together. The analytical method of inquiry has been defined as the art or method of finding out the truth of a proposition by first supposing the thing done, and then reasoning back step by step till one arrives at some admitted truth. It is called also the method of invention or resolution. Analysis in mathematics may be exercised on finite or infinite magnitudes or numbers. The analysis of finite quantities is the same as specious arithmetic or algebra. That of infinites, called also the new analysis, is particularly used in fluxions or the differential calculus. But analysis could be employed also in geometry, though Euclid preferred to make his immortal work synthetic; it is, therefore, a departure from correct language to use the word analysis, as many do, as the antithesis of geometry; it is opposed, as already mentioned, to synthesis, and to that alone.

In chemistry, the examination of bodies with the view of ascertaining of what substance they are composed, and in what proportion these substances are contained in them. The former is called qualitative and the latter quantitative analysis. Chemical analysis is classified into blowpipe, qualitative, gravimetrical, and volumetric analysis; and the proximate and the ultimate analysis of organic bodies.

1. Blow-pipe analysis.

2. Qualitative analysis is employed to find out the composition and properties of any unknown substance, and to separate different substances from each other.

3. Gravimetrical analysis, or quantitative analysis by weight, is the method of separating out of a weighed quantity of a compound its constituents, either in a pure state or in the form of some new substance of known composition, and accurately weighing the products; from the results of these operations the per-

centage of the constituents contained in the substance can be determined.

4. Volumetrical analysis, or quantitative analysis by measure, determines the amount of the constituents contained in a given solution by: (a) Neutralization of a measured quantity of the liquid by a certain volume of a standard solution of acid or alkali. (b) By the quantity of a standard solution of an oxidizing or reducing agent required to oxidize or reduce a measured quantity of the liquid to be tested. (c) By observing when no further precipitation takes place on adding the standard solution of the reagent to a known volume of the liquid to be tested.

5. By proximate analysis we determine the amount of sugar, fat, resin, alkaloid, etc., contained in an organic compound, each of these being removed and separated by different solvents, etc.

6. By ultimate analysis of an organic substance we determine the percentage of carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus contained in it. Thus the amount of carbon and hydrogen is determined by burning a weighed quantity of the substance in a combustion tube along with oxide of copper, and collecting the water produced in a weighed U tube filled with chloride of calcium, and the carbonic acid gas in weighed bulbs filled with caustic potash.

In other sciences, etc., the separation of anything which becomes the object of scientific inquiry into its constituent elements; also the result thus obtained.

ANAM, or ANNAM, a French protectorate comprising the central part of French Indo-China. Its area is 52,100 square miles.

Topography.—Anam is mountainous on the N. but in the E. is nearly level, terminating toward the sea in an alluvial plain yielding good crops of rice, cotton, fruits, ginger, and spices, and a great variety of varnish trees, palms, etc. The principal river is the Mekong, which has numerous tributaries, many of them being joined together by canals, both for irrigation and commerce. Agriculture is the chief occupation, but many of the inhabitants are engaged in the spinning and weaving of cotton and silk into coarse fabrics, the preparation of varnish, iron smelting, and the construction of ships or junks. The chief products of the country are cotton, rice maize, and other cereals. Tobacco, sugar, manioc, and bamboo are also extensively produced. The production of raw silk forms an important industry, and about 800,000 kilograms are produced annually. Copper, iron, zinc, and gold exist in various parts of the country. The imports in 1918 amounted to 5,067,518 francs, and the exports to 8,705,679 francs. The leading exports are cotton yarn, cotton, tea, petroleum, paper goods, and tobacco. The chief imports are sugar, rice, cinnamon, tea, and paper. Pop. about 5,200,000.

People.—The inhabitants are said to be the ugliest of the Mongoloid races of the peninsula, being under the middle size and less robust than the surrounding peoples. Their language is monosyllabic, and is connected with the Chinese. The religion of the majority is Buddhism, but the educated classes hold the doctrines of Confucius; besides which there are 420,000 Roman Catholics. The capital is Huë.

History.—Anam was conquered by the Chinese in 214 B. C., but in 1428 A. D. it completely won its independence. The French began to interfere actively in its affairs in 1847 on the plea of protecting the native Christians. By the treaties of 1862 and 1867 they obtained the southern and most productive part of Cochin-China, subsequently known as French Cochin-China; and in 1874 they obtained large powers over Tonquin, notwithstanding the protests of the Chinese. Finally, in 1883, Tonquin was ceded to France, and next year Anam was declared a French protectorate. After a short period of hostilities with China the latter recognized the French claims, and Tonquin is now directly administered by France, while Anam is entirely under French direction.

ANAPA, an important seaport and fortified town in Russian Circassia, on the Black Sea, a station of the Russian navy.

ANARCHISM, a tendency founded upon anarchy in human society. By anarchy is not to be understood the word in its exaggerated sense of chaos and disorder, but literally a state of society in which authority does not exist; that is, a society with the greatest imaginable independence of the individual, without law and without any relations whatever of superior and inferior. There were tendencies to anarchy in the thought of antiquity and of the Middle Ages as well as in modern times. Anarchistic tendencies first became notably influential as a phase of thought toward the middle of the 19th century, when they were developed under an increasing sense of the misery of the oppressed masses of humanity. The founder of modern anarchism was Peter Joseph Proudhon (1809-(1865) who wrote "What is Property?" He held that under the compulsion of the laws of property there existed be-

tween employers and workingmen a condition of exchange in commodities most unfavorable to the latter, in consequence of which the capitalist, without working himself, appropriated to himself, most unjustly, a portion of the earnings of the worker. Hence Proudhon's famous conclusion: "Property is robbery." As a remedy for these unjust conditions, Proudhon held that there should be a free activity of industrial forces under which there would be a just exchange of commodities corresponding to the actual relations of value. In order to achieve such conditions Proudhon rejected law and authority of every kind and demanded a social condition in which there should be absolutely no authority. As a characterization of this condition he was the first to employ the word "anarchy." In his essay, "A General Idea of the Revolution" (1851), he set forth his theory.

It found much approval in Germany at first. The doctrine was elaborated by Max Stirner in a book called "The Individual and His Property," published in 1845. Stirner acknowledges nothing but the will of the individual. He rejects every combination among men toward a higher unity, every compulsion of civilized principles—all of these signifying for him nothing but the enthralment of the individual will. Stirner advocated the path of revolution. The triumph of the reaction in 1848 crowded anarchistic teachings into the background. In 1852 Proudhon himself in his essay on "The Federative Principle," declared anarchy to be impracticable, and held the correct form of government to be a federation of autonomist communities. The labor agitations that began in the '60's were accompanied by a development of the anarchistic party, chiefly under the influence of Russian agitators. The founder of this party was Michael Bakunin (1814-1876). Since 1864 Bakunin was active in Switzerland as an anarchistic agitator. Unlike Proudhon, he advocated revolution as the means to the end, but he drew the line at murder. Bakunin sent his disciple, Sergei Netshaye, to Russia and there, in 1869, the latter developed the so-called "propaganda of action"; that is, an agitation by means of deeds of violence, murder and disorder, not for the purpose of overcoming the existing order of society, but simply to arouse sentiment by the effect of horrible deeds.

One of the most eminent representatives of anarchistic doctrines is the Russian Prince Krapotkin (born in 1842). Krapotkin advocates a system of communistic anarchy based upon the idea of free production and consumption, with a free development of industrial powers in groups and societies. According to his theory, everybody should share as he pleased in production and also in the enjoyment of the fruits of collective effort. This is the programme of the greater number of the anarchists of to-day, especially of those who are called the Latin anarchists, being those believers in the doctrine who live in western Switzerland, the S. of France, in Italy and in Spain. With the growing development of the Social Democratic organization, anarchy fell more and more into disfavor. These two tendencies, anarchy and socialism, have a common source in a sense of the misery of the oppressed masses, but their ends are directly opposed, the aim of anarchy being to achieve the extreme of individualism, while that of socialism aims to realize the extreme of collectivism. At the Congress of International Societies of Workingmen, held at The Hague, in 1872, at the instance of Carl Marx, the International Alliance of the Social Democracy, which followed the doctrines of Bakunin, was excluded, and ever since the hostility between the tendencies has been increasing. The German law against socialism, passed in 1878, caused, for the time, a tendency toward anarchism in consequence of the formation of revolutionary groups under the leadership of Most (1846), a former member of the German Reichstag. In consequence of this Most was expelled from the Social Democratic Party and went to London, but, in 1882, he came to New York and advocated the "propaganda of action." Most sought to improve upon the teaching of Proudhon by advocating the regulation of production and price through common action among groups of workers.

In Germany, unlike the Latin countries, the anarchistic agitation has never had much significance. The "propaganda of action," however, has resulted in various deeds of violence—for instance, the attempted assassination of Emperor Wilhelm I., by Hoedel (1878), and the attempt of Reinsdorf against the German princes at the dedication of the Niederwald monument, in 1883. The latter caused the enactment of the law against the criminal use of explosives on June 9, 1884. In consequence of the assassination of the French President Carnot by an Italian anarchist, in December, 1894, there was an attempt made to increase the severity of the German laws, but the proposition was rejected by the Reichstag. The assassination of the Empress Elizabeth of Austria, by an Italian anarchist, in 1898, and also that

of the Spanish statesman Cánovas by an Italian anarchist led the Italian Government to feel that it was its duty to call for some international action for the suppression of anarchists and an anti-anarchist conference was held at Rome in the latter part of 1878. It had, however, no further result than a proposition to institute a sort of international intelligence service for the watching of anarchists. King Humbert of Italy was, notwithstanding this vigilance, assassinated by an anarchist, in 1900 (July 29).

Francisco Ferrer, who at one period of his life had been actively engaged in anarchistic propaganda, but had later abandoned it, was arrested in 1909, following serious riots in Barcelona, Spain. It was charged that his teachings were responsible for the uprising. In spite of the impossibility of proving these charges definitely, he was executed on Oct. 12, 1909. In November, 1910, an attempt was made by a group of anarchist Socialists to assassinate the Mikado of Japan. Twelve of these were executed. King George of Greece was assassinated at Salonica on March 18, 1913.

Following the assassination of President McKinley in 1902 by an avowed anarchist, Leon Czolgosz, Congress passed laws excluding anarchists from the classes permitted to immigrate into the United States.

In 1892 France passed the law imposing the death penalty upon those who should cause damage to property by the use of explosives. After the attempt of Vaillant in the Chamber of Deputies and the murder of President Carnot, special laws against anarchists were passed in 1893 and 1894, whereby the glorification of anarchistic crime and the incitement thereto were made criminal offenses and the punishment of anarchists was provided for. In 1894, Switzerland passed a law against the criminal use of explosives and the incitement of such crimes. Similar laws were also passed in 1894-1896 in Spain and Italy. Disordered conditions following upon the end of the World War gave the anarchists an opportunity for carrying on effective propaganda. Although anarchists as a class did not dominate in the Bolshevik revolution in Russia, both the leaders and the rank and file of the movement carried out to a large degree the principles of anarchism.

There was persistent propaganda carried on in the United States with the greatest audacity, following the war, by avowed anarchists, the most prominent of whom were Emma Goldman and Alexander Berkman. The officers of the Government, under authority given by war measures, began vigorous measures in December, 1919, for the suppression of anarchistic and communistic propaganda. The headquarters of the radical societies throughout the country were raided and many of the leaders were taken prisoners for the purpose of deportation. In the same month about 300 anarchists, including Emma Goldman and Berkman, were deported. Several thousand other anarchists were held in confinement pending examination.

ANASTASIUS (an-a-stā'shus), the name of four Popes, the first and most eminent of whom held that office for only three years (398-401). He enforced celibacy on the higher clergy, and was a strong opponent of the Manichæans and Origen.

ANASTASIUS I., Emperor of the East, succeeded Zeno, A. D. 491, at the age of 60. He distinguished himself by suppressing the combats between men and wild beasts in the arena, abolishing the sale of offices and building the fortifications of Constantinople. His support of the heretical Eutychians led to a dangerous rebellion and his anthematization by the Pope. He died A. D. 518.

ANATOMY (Greek, "a cutting up or dissecting"), the science of the form and structure of organized bodies; it is practically acquired by separation of the parts of a body, so as to show their distinct formation, and their relations to one another. It is, therefore, a branch of the science of biology, and consists of two great divisions—the anatomy of animals, styled zoötomy, and that of plants, phytotomy.

History of Anatomy.—The real founder of the science was Aristotle, born 384 B. C. He seems to have based his systematic views of comparative anatomy on the dissection of animals, but not of men. He first gave the name aorta to the great artery. No real progress in human anatomy was made, owing to the researches being confined to animals, till the time of Erasistratus (250 B. C.), who was the first to dissect human bodies—the bodies of criminals. Herophilus also is said to have dissected living subjects. Celsus (63 B. C.), in his "De Medicina," wrote on anatomy. Galen (131 A. D.) dissected apes, as being most like human subjects, though he occasionally obtained bodies of persons found murdered; and his writings show a knowledge of human anatomy. Avicenna (980 A. D.), born in the province of Khorassan, was a good osteologist, and described some structures not alluded to by Galen. The medical schools at Bologna, Padua, and Salerno became famous in the 13th cen-

tury, but no very material progress was made in anatomy. Mondino, born at Milan, 1315, is considered the real restorer of anatomy in Italy.

William Horman, of Salisbury, wrote in 1530, "Anatomia Corporis Humani." Thomas Gemini, of London, in 1545, engraved upon copper the anatomical figures of Vesalius, which had appeared in Germany upon wood. Thomas Vicary, in 1548, is said to be the first who wrote in English on anatomy.

In the 17th century, progress was rapid. In 1619 Harvey discovered the circulation of the blood, and the microscope was employed to detect the structure in minute vessels. In 1622 Aselli discovered and demonstrated the existence of the lymph vessels. The glandular organs were investigated by Wharton; Malpighi, Swammerdam, and the illustrious Ruysch, by the use of injections and the aid of the microscope, gave a new impulse to research in the minute structures. In Italy, which still retained its former pre-eminence, we find Pacchioni, Valsalva, Morgagni, Santorini, Mascagni, and Cotunni; in France, Winslow, D'Aubenton, Lieutaud, Vicq d'Azyr, and Bichat, the founder of general anatomy; in Germany, Haller and Meckel prepared the way for greater achievements in the 19th century; in Great Britain, Cowper, Cheselden, Hunter, Cruikshank, Monro, and Charles Bell contributed to the progress of science; while Holland was worthily represented by Boerhaave, Albinus, Camper, Sandifort, and Bonn. The enormous strides made in practical anatomy during the last 50 years are largely due to the use of the microscope.

The necessity of a union of theory and practice led to the study of pathological anatomy, which is the dissection and study of structures as modified by disease. In the 16th century, many notices of pathological anatomy occur, but Morgagni (1767) is regarded as the true founder of pathological anatomy. He was followed by Lieutaud, Sandifort, Hunter, Bailie, Meckel the younger, and others. The recent change of direction given to the study of pathological anatomy must be ascribed to Bichat and the pupils of Broussais, among whom may be mentioned the names of Lænnec, Louis, Andral, Leber, Virchow, and Bennett.

Theoretical anatomy is divided into general and special. General anatomy gives a description of the elementary tissues of which the systems and organs of the body are composed, as preliminary to an examination of them in their combined state in the various organs; it also investigates their laws of formation and combination, and the changes which they undergo in various stages of life. Anatomy has been divided, though not with scientific precision, into seven branches of study. (1) Osteology, which treats of the bones, including the cartilages of the joints (chondrology). (2) Arthrology, which describes the ligaments or bands that unite the bones of various joints. (3) Myology explains the system of the muscles, which, by their contractile power, serve to impart motion to the bones and joints; while, like the bones, they contribute to form the cavities of the body, and to protect the internal organs. Their form also serves to produce the external shape and symmetry. (4) Angeiology describes the vessels and ducts, with their complex network and ramifications spreading over most parts of the body, and divided into two great systems: (a) the blood vessels with the heart, a fleshy organ propelling the blood through the pulsating vessels or arteries, from which it returns to the heart, after circulation through the veins; (b) the lymphatics, by means of which a certain fluid (lymph) is passed through a series of organs named lymphatic glands, and afterward enters the large veins at the root of the neck. The lacteals, which absorb the chyle from the intestine, also belong to this system of vessels. (5) Neurology, or the doctrine of the nerves, describes the nervous system, as divided into, first, the two central masses of the brain and the spinal cord; second, the ramifications of nerves running from the brain and spinal cord to almost all points of the surface; and lastly, the order of nerves having a peculiar structure and styled the ganglionic system of nerves. (6) Splanchnology describes the viscera or organs formed by combination of the distinct systems of veins, nerves, lymphatics, etc., and mostly situated in the cavities of the body. These are divided into five groups, viz.: (a) the organs of the senses—sight, hearing, smell, taste, and touch; (b) of voice and respiration —nostrils, mouth, larynx, trachea, and lungs, with the thyroid gland, the thymus gland, and the diaphragm; (c) digestive organs—the mouth, with its salivary glands, the throat, gullet, the stomach, the intestines, with the liver, spleen and pancreas; (d) the urinary organs—kidneys, ureters, bladder, and urethra; (e) sexual organs of both sexes. (7) Embryology, the science which treats of the first or rudimentary stage of existence.

The eldest of the Monros of Edinburgh University first gave this branch of the study its due prominence.

Comparative anatomy, the investigation and comparison of the structures

of two or more animals, has always preceded anthropotomy, or dissection of the human subject, but was first treated systematically as a distinct science by Cuvier and his pupil, Meckel the younger. Blumenbach, Tiedemann, Geoffroy, St. Hilaire, Goethe, Owen, Wagner, Bowman, Todd, Milne-Edwards, Remak, Leydig, Frey, Haeckel, Agassiz, Carpenter, Allman, Sharpey, Allen Thomson, Huxley, Turner, and Flower, may be named as eminent contributors to this branch of science.

The most general and available assistance in the study of anatomy is found in anatomical engravings and plates on wood and copper. This assistance was known in ancient times. Aristotle affixed to his works on anatomy some anatomical drawings, which have been lost.

ANAXAGORAS (an-aks-ag'ō-ras), a famous Greek philosopher of the Ionic school, born at Clazomenæ in 500 B. C. He explained eclipses and advanced physical science. In philosophy, he taught that the universe is regulated by an eternal self-existent and infinitely powerful principle, called by him mind; matter he seems to have asserted to be eternal, what is called generation and destruction being merely the temporary union and separation of ever existing elements; he disproved the doctrine that things may have arisen by chance. Fragments of his "Treatise on Nature" are still in existence. He died in 428 B. C.

ANCACHS (än-kächs'), a department of Peru, bounded N. by the department of Libertad, S. by that of Lima, and extending from the Pacific eastward to the headwaters of the Amazon. Area, 16,562 square miles; pop. about 500,000. It is rich in minerals, and is traversed by a railway. Capital, Huaraz.

ANCHISES (än-kī'sēz), the father of the Trojan hero Æneas, who carried him off on his shoulders at the burning of Troy and made him the companion of his voyage to Italy. He died at Drepanum, in Sicily.

ANCHITHERIUM (an-kē-the'rē-um), a fossil mammal belonging to the family *palæotheridæ*. It has been called also hipparitherium, suggesting an affinity to the horse in the neighboring family of *equidæ*.

ANCHOR, a well-known instrument for preventing a ship from drifting, by mooring her to the bottom of the sea, provided that the water is shallow enough to permit of this being done. Its invention was at a very early period. Those of the early Greeks were simply large stones, sacks filled with sand, or logs of wood loaded with lead. Then the Tuscans, or Midas, King of Phrygia, introduced a tooth, or fluke, which was ultimately exchanged for two. The modern anchor consists of a long bar or shank of iron, branching out at the lower extremity into two arms ending in flukes barbed at their extremity, and with a stock of oak or wood at the upper one, while it terminates in a ring, to which a rope or chain is affixed. The arms or flukes are designed to penetrate and fix themselves in the sea-bottom.

An anchor, in architecture, is a kind of carving somewhat resembling an anchor. It is generally used as part of the enrichment of the bottoms of capitals in the Tuscan, Doric, and Ionic orders, or as that of the boultins of bed-moldings in Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately throughout the whole building.

ANCHOVY, a fish, the *engraulis encrasicolus* of Fleming; the *engraulis vulgaris* of Cuvier. It belongs to the herring family. In general, its length is from 4 to 5 inches. Shoals of anchovies annually enter the Mediterranean, and various fisheries exist along its northern shores, the most celebrated being at Gorgona, a small island W. of Leghorn.

ANCHOVY PEAR, the English name of the genus *grias*. *Grias cauliflora*, the stem-flowering anchovy pear, is an elegant tree, with large leaves, which grows in the West Indies. The fruit, which is eaten, tastes like that of the mango, and is pickled in the same way.

ANCHYLOSIS, the coalescence of two bones, so as to prevent motion between them. If anything keep a joint motionless for a long time, the bones which constitute it have a tendency to become anchylosed, in which case all flexibility is lost.

ANCONA, capital of a province in Italy, is situated on a promontory of the Adriatic coast, 127 miles S. E. of Ravenna by rail. The seat of a bishop. Pop. about 70,000.

It is still the most important seaport on the Adriatic between Venice and Brindisi. The manufactures are silk, ships' rigging, leather, tobacco, and soft soap; the exports (declining in recent years) are cream of tartar, lamb and goat skins, asphalt, bitumen, corn, hemp, coral, and silk. A mole of 2,000 feet in length, built by the Emperor Trajan, and a triumphal arch of the same emperor, are the most notable monuments of antiquity. One of the most venerable buildings is the Cathedral of San Ciriaco, built in the 11th

century, and possessing the oldest cupola in Italy. Ancona is supposed to have been founded about 380 B. C. by Syracusans, who had fled from the tyranny of Dionysius the Elder. It was destroyed by the Goths, rebuilt by Narses, and again destroyed by the Saracens in the 10th century. It afterward became a republic; but in 1532 Pope Clement VII. annexed it to the states of the Church. In 1797 it was taken by the French; but in 1799 General Meunier was obliged to surrender it to the Russians and Austrians, after a long and gallant defense. In 1832 a French force took possession of the town and kept it in their hands till 1838, when both French and Austrians retired from the Papal states. In 1849 a revolutionary garrison in Ancona capitulated after enduring a siege by the Austrians of 25 days. In 1861 the flag of the kingdom of Italy waved over the ancient city. "The March of Ancona" was the name applied to the territory lying between the Adriatic and the Apennines, from Tronto N. W. of San Marino. Erected into an independent marquisate under the Longobards, the district was a papal dependency from the 13th century, but passed into the hands of Victor Emmanuel in 1860.

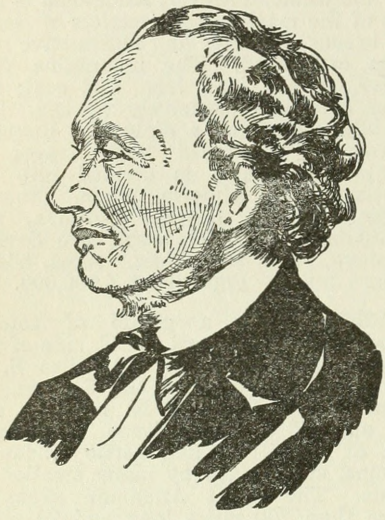
ANCRUM MOOR, Roxburghshire, 5¼ miles N. W. of Jedburgh, was in 1544 the scene of the defeat of 5,000 English, under Sir Ralph Evers and Sir Brian Latoun, by a Scottish force under the Earl of Angus and Scott of Buccleuch.

ANDALUSIA, a large and fertile region occupying the S. of Spain. Its shores are washed both by the Mediterranean and the Atlantic. The name is a form of Vandalitia or Vandalusia, from the Vandals, who overran it in the 5th century. When it was a Phœnician trade emporium, it was called Tartessus; the Romans named it Bætica, from the river Bætis, the modern Guadalquivir. In the 8th century, the Moors founded here a splendid monarchy, which quickly attained a high degree of civilization. The four great Moorish capitals were Seville, Cordova, Jaën, and Granada. During the darkness of the Middle Ages, Cordova was "the Athens of the West, the seat of arts and sciences." The Moorish kingdoms were finally conquered by the Castilians in 1235-1248. Christian intolerance seriously and permanently impoverished the country; but later, under the Spaniards, painting here arose in a new form in the schools of Velasquez and Murillo. Andalusia mainly consists of the great basin of the Guadalquivir, and the mountainous districts which bound it. In the S., the Sierra Nevada attains a height of 11,657 feet. Cotton and sugar-cane flourish in the open air, and the cactus and aloe form impenetrable hedges. Wine and oil abound; but some tracts are very barren. On the whole, however, Andalusia is still one of the most fertile districts of Spain. Its breeds of horses and mules have long been celebrated. The mountains yield silver, copper, lead, iron, and coal; and some ores are extensively worked. The Andalusians speak a dialect of Spanish, manifestly tinctured with traces of Arabic. Andalusia is divided into the provinces of Almeria, Jaën, Malaga, Cadiz, Huelva, Seville, Cordova, and Granada. The chief towns are Seville, Cordova, Jaën, and Cadiz. Area, 33,340 square miles. Pop. about 4,000,000.

ANDAMANS, a group of thickly wooded islands toward the E. side of the Bay of Bengal, about 680 miles S. of the Hooghly mouth of the Ganges, between 10° and 14° of N. latitude, and 92° and 94° of E. longitude. They consist of the Great and Little Andaman groups, surrounded by many smaller islands. The Great Andaman group is more than 200 miles long and 20 miles broad, and comprises four islands, the North, Middle, and South Andaman, and Rutland Island. The Little Andaman, which lies about 30 miles S. of the larger group, is 28 miles long by 17 miles broad. The total area is 2,508 square miles. The native inhabitants stand in the lowest stage of civilization, and belong to the same family as the original small-statured races in southern India; their number in the entire group is steadily decreasing and now is only about 1,300. The total population of the islands is about 18,000. Those that have come into contact with the convicts here have deteriorated morally. Their height seldom reaches five feet; their complexion is very dark, the hair crisp and woolly. The men go naked; the women wear round the loins a girdle of leaves. They have no settled dwellings, but go freely from island to island, and subsist on the fruit and beasts of the wood, and upon fish. A British settlement was made on North Andaman in 1789, but abandoned in 1796 for Penang. The capital of the present settlement is at Port Blair, on South Andaman, the largest island of the group. The harbor here is one of the finest in the world. Since 1858 the Andamans have been a penal settlement for Sepoy mutineers and other life convicts.

ANDERSEN, HANS CHRISTIAN (ăn'der-sen), a Danish poet and story writer, born at Odense, April 2, 1805.

Having lost his father early in childhood, the boy received his elementary education in a charity school. He traveled in Germany (1828), and made tours in France, Italy, and the East. His impres-



HANS CHRISTIAN ANDERSEN

sions of Italy are embodied in "The Improvisatore" (1835). In the same year appeared "O. T.," a novel of life and nature in the North. "Only a Fiddler" (1837) and "The Poet's Bazar" (1842) followed. He is seen at his very best in "The Picture Book Without Pictures." Among his dramatic compositions are "The Mulatto," "The Flowers of Happiness," "Raphaella," "Ahasuerus," and "The Two Baronesses." In the English speaking world Andersen's great fame will ever rest upon his stories for children, the celebrated "Wonder Tales." He died Aug. 4, 1875.

ANDERSON, city in Indiana, county-seat of Madison co.; on several railroads and a hydraulic canal with a fall of nearly 50 feet; 36 miles N. E. of Indianapolis. It is principally engaged in manufactuing, and has National banks, public library, high school, daily and weekly newspapers, etc. Pop. (1910) 22,476; (1920) 29,767.

ANDERSON, a city of South Carolina and the county-seat of Anderson co. It is about 100 miles N. W. of Raleigh, on the Blue Ridge and the Charleston and Western Carolina railroads. The city is in an important cotton-growing and agricultural region, and has also extensive industries, including cottonseed mills, fertilizer factories, flour mills, machine shops, etc. There are excellent schools and libraries, a city hall, a hospital, and a county court house. Power is furnished to the city by a large electric power station on the Seneca river, 10 miles from the city. Pop. (1910) 9,654; (1920) 10,570.

ANDERSON, EDWIN HATFIELD, an American librarian, born in Zionville, Ind., in 1861. He graduated from Wabash College in 1883 and afterward studied at Columbia University and at the New York State Library School. He was cataloguer of the Newberry Library of Chicago and in the Carnegie Free Library in Braddock, Pa. In 1885 he organized and became librarian of the Carnegie Library, Pittsburgh, acting in that capacity until 1904. In the following year he became the director of the New York State Library and Library School, and in 1913 was appointed Director of the New York Public Library.

ANDERSON, JOHN FISHER, American physician, born in Fredericksburg, Va., in 1873. He was educated in the public schools of this city and studied medicine at the University of Virginia and also in Vienna and Liverpool. He was appointed assistant surgeon in the United States Public Health and Marine Service in 1898 and did duty in connection with the yellow fever. After acting as quarantine inspector and immigrant inspector at several ports, he was sanitary observer in several cities in Europe from 1899 to 1901. From 1902 to 1909 he was assistant director of the Hygienic Laboratory in Washington, being appointed director in 1916. He was also assistant professor of hygiene in Rutgers College. One of the most eminent of American bacteriologists, he wrote many articles on his investigations into the cause of diseases.

ANDERSON, MARY (MRS. A. DE NAVARRO), an American actress, born in Sacramento, Cal., July 28, 1859. She played for the first time at Louisville, in 1875, in the character of Juliet. Her success was marked and immediate, and during the following years she played with increasing popularity in the principal cities of the United States in various rôles. In 1883 she appeared at the Lyceum Theater, in London, and speedily became well known in England. In 1890, one year after retiring from the stage, she married A. de Navarro of New York.

ANDERSON, ROBERT, an American military officer, noted for his defense of Fort Sumter, where the first gun was fired in the Civil War. He was born near Louisville, Ky., June 14, 1805; was graduated at West Point, and served in

the Black Hawk, Seminole, and Mexican Wars. He was promoted major in 1857; took command of the troops in Charleston harbor in November, 1860; removed his forces from Fort Moultrie to Fort Sumter, Dec. 26; was invested there by the Confederates who bombarded the fort April 12-13, 1861; and evacuated the fort April 14. He was promoted Brigadier-General in 1861, and was retired in 1863, with the rank of brevet Major-General. He died in Nice, France, Oct. 27, 1871.

ANDERSON, WILLIAM HAMILTON, American temperance advocate, born in Carlinville, Ill., Aug. 8, 1874; studied at Blackburn College and University of Michigan; taught school 1892-1894, and practiced law at Carlinville, 1896-1900. He became attorney for the Anti-Saloon League of Ill., Jan. 1, 1900, and from that time on has devoted his time wholly to the temperance cause. In 1914 he became State Superintendent of the New York State Anti-Saloon League. In 1920, he provoked considerable controversy by an attack upon certain members of the Catholic church whom he charged with obstructing the operation of prohibition laws.

ANDERSONVILLE, a village in Georgia, noted as having been the seat of a Confederate States military prison, which was notorious for unhealthfulness and for barbarity of discipline. Between Feb. 15, 1864, and April, 1865, 49,485 prisoners were received, of whom 12,926 died in that time of various diseases. Henry Wirz, the superintendent, was tried for injuring the health and destroying the lives of the soldiers confined here, was found guilty and hanged, Nov. 10, 1865. The long trenches where the soldiers were buried have since been laid out as a cemetery.

ANDES (an'dēz), or, as they are called in Spanish South America, Cordilleras (ridges) de los Andes, or simply Cordilleras, a range of mountains stretching along the whole of the W. coast of South America, from Cape Horn to the Isthmus of Panama and the Caribbean Sea. In absolute length (4,500 miles) no single chain of mountains approaches the Andes, and only a certain number of the higher peaks of the Himalayan chain rise higher above the sea-level. Several main sections of this huge chain are distinguishable. The southern Andes present a lofty main chain, with a minor chain running parallel to it on the E., reaching from Tierra del Fuego and the Straits of Magellan, northward to about latitude 28° S., and rising in Aconcagua to a height of 22,860 feet. North of this is the double chain of the central Andes, inclosing the wide and lofty plateaus of Bolivia and Peru, which lie at an elevation of more than 12,000 feet above the sea. The mountain system is here at its broadest, being about 500 miles across. Here are also several very lofty peaks, as Illampu or Sorata (21,484 feet), Sahama (21,054), Illimani (21,024).

Further N. the outer and inner ranges draw closer together, and in Ecuador there is but a single system of elevated masses, generally described as forming two parallel chains. In this section are crowded together a number of lofty peaks, most of them volcanoes, either extinct or active. Of the latter class are Pichincha (15,918 feet), with a crater 2,500 feet deep; Tunguragua (16,685 feet); Sangay (17,460 feet); and Cotopaxi (19,550 feet). The loftiest summit here appears to be Chimborazo (20,581 feet); others are Antisana (19,260 feet) and Cayambe (19,200 feet). Northward of this section the Andes break into three distinct ranges, the eastmost running north-eastward into Venezuela, the westmost running north-westward to the Isthmus of Panama. In the central range is the volcano of Tolima (17,660 feet). The western slope of the Andes is generally exceedingly steep, the eastern much less so, the mountains sinking gradually to the plains.

The whole range gives evidence of volcanic action, but it consists almost entirely of sedimentary rocks. Thus mountains may be found rising to the height of over 20,000 feet, and fossiliferous to their summits (as Illimani and Sorata or Illampu). There are about 30 volcanoes in a state of activity. The loftiest of these burning mountains seems to be Gualateïri, in Peru (21,960 feet). The heights of the others vary from 13,000 to 20,000 feet. The passes are generally at a great height, the most important being from 10,000 to 15,000 feet. Railways have been constructed to cross the chain at a similar elevation.

The Andes are extremely rich in the precious metals, gold, silver, copper, platinum, mercury and tin all being wrought; lead and iron are also found. The llama and its congeners—the guanaco, vicuña and alpaca—are characteristic of the Andes. Among birds, the condor is the most remarkable. The vegetation necessarily varies much according to elevation, latitude, rainfall, etc., but generally is rich and varied. From the Andes rise two of the largest water systems of the world—the Amazon and its affluents, and the La Plata and its affluents. Besides which, in the N., from its slopes flow the Magdalena

to the Caribbean Sea, and some tributaries to the Orinoco. In the Andes are towns at a greater elevation than anywhere else in the world, the highest being the silver-mining town of Cerro de Pasco (14,270 feet), the next being Potosi.

ANDESITE, a group of volcanic rocks, gray, reddish or dark brown in color. The ground-mass of these rocks is usually composed of feldspar-microlith, scattered through which are abundant crystals of plagioclase feldspar. Hornblende and augite, one or both, are generally present, together with magnetite, which is often very abundant. Andesite occurs chiefly in Tertiary and more recent strata, and is found in Hungary, Transylvania, Siebengebirge, Santorin, Iceland, the Andes, the western part of the United States, etc.

ANDIRA, a genus of leguminous American trees, with fleshy plum-like fruits. The wood is well fitted for building. The bark of *andira inermis*, or cabbage-tree, is narcotic and is used as an anthelminthic under the name of worm bark or cabbage bark. The powdered bark of *andira araroba* is used as a remedy in certain skin diseases, as herpes.

ANDORRA (an-dor'a), a valley in the eastern Pyrenees, between the French department of Ariége and the Spanish province of Lerida, part of Catalonia. It is inclosed by mountains, through which its river, the Balira, breaks to join the Segre at Urgel; and its inaccessibility naturally fits it for being the seat of the interesting little republic which here holds a kind of semi-independent position between France and Spain. Area (divided into six communes), 175 square miles. Population, 6,800. The former abundant forests have been much thinned for fuel; there is much excellent pasture; vines and fruit trees flourish on the lower grounds; and the mountains contain rich iron mines, unwrought lead supplies and mineral springs. The chief occupations are agriculture, cattle breeding, trade in wood, charcoal and wool, and especially smuggling. Andorra is said to have been declared a Free State by Charlemagne. Now the state stands under the common protectorate of France and of the Bishop of Urgel. The Republic is governed by a sovereign council of 24 members, chosen by certain heads of houses, and the council elects a President for four years, a syndic, under whom is a second syndic. Since 1882, the interests of France in the state are represented by a permanent delegate. The Andorrans are good-natured, hard-working mountaineers, hospitable, moral and devoted to liberty. They are of the Catalonian stock, and speak a dialect of Catalonian. The capital is Andorra la Vieja (pop. 600).

ANDOVER, a town in Essex co., Mass.; on the Merrimac river and the Boston and Maine railroad; 23 miles N. of Boston. It is widely known as the seat of the Phillips Academy for boys, and the Abbot Academy for girls, formerly also the Theological Seminary, and has manufactories of flax, shoes and woolen goods, a National bank, Memorial Hall and school libraries, and a property valuation of over $4,000,000. Harriet Beecher Stowe lived here many years, and it is the birthplace of Elizabeth Stuart Phelps Ward. Pop. (1910) 7,301; (1920) 8,268.

ANDRASSY, JULIUS, COUNT (andra'shē), Hungarian statesman, born March 8, 1823; studied at the Pest University; took part in the Revolution of



COUNT JULIUS ANDRASSY

1848; was condemned to death, but escaped and went into exile; appointed Premier when self-government was restored to Hungary, in 1867; became Imperial Minister for Foreign Affairs in 1871; was a conspicuous member of the Congress of Berlin in 1878; negotiated the German-Austrian alliance with Bismarck in 1879; and the same year retired from public life. He died Feb. 18, 1890.

ANDRASSY, JULIUS, a Hungarian statesman, son of Count Andrassy. He entered his political career in 1884 with his entrance to the Reichstag and in 1892 was under-secretary. In the fol-

lowing year he became Secretary of Education and was Hungarian Minister to the King in 1894. In 1898 he abandoned the Liberal party, but returned to it a year later. He was Minister of the Interior in 1906 and held that office until 1909. In 1912 he represented Austria in the diplomatic attempts to prevent the outbreak of the Balkan War. In 1917 he served as Prime Minister of Hungary. He was, in general, opposed to Austria's warlike attitude, but he supported the Government until 1916, when he took his place with the opposition. He wrote several works on political subjects, including "The Development of Hungarian Constitutional Liberty" (1908).

ANDRÉ, JOHN (an-drā'), a British military officer, born in London in 1751; entered the army in 1771; went to Can-



MAJOR ANDRÉ

ada in 1774; and was made prisoner by the Americans in 1775. After his exchange, he was rapidly promoted, and in 1780 was appointed Adjutant-General, with the rank of Major. His prospects were of the most flattering kind when the treason of Arnold led to his death. The temporary absence of Washington having been chosen by the traitor as the most proper season for carrying into effect his design of delivering to Sir Henry Clinton the fortification at West Point, then under his command, and refusing to confide to any but Major André the maps and information required by the British general, an interview became necessary, and Sept. 19, 1780, André left New York in the sloop-of-war "Vulture," and on the next day arrived at Fort Montgomery, in company with Beverly Robinson, an American. Furnished with passports from Arnold, Robinson and André the next day landed and were received by the traitor at the water's edge. Arnold delivered to André drafts of the works at West Point and memoranda of the forces and the latter returned to the beach. But the ferrymen, who were Americans, refused to carry him to the "Vulture" and he was compelled to return by land. Accompanied by Smith, an emissary of Arnold, and provided with a passport under his assumed name of Anderson, he set out. At Tarrytown he was first stopped, and then arrested, by three Americans. André offered them his money, horse, and a large reward, but without avail. They examined his person, and, in his boots, found the fatal papers. He was then conveyed to Colonel Jameson, commander of the American outposts. On the arrival of Washington, André was conveyed to Tappan and tried by a board of general officers, among whom were General Greene, the president, Lafayette, and Knox. Every effort was made by Sir Henry Clinton to save him, and there was strong disposition on the American side to do so. His execution, originally appointed for Sept. 30, did not take place till Oct. 2. His remains which were buried on the spot, were afterward removed to London, and now repose in Westminster Abbey.

ANDREA DEL SARTO. See SARTO.

ANDRÉE, SALOMON AUGUSTE (andrā'), a Swedish aëronaut, born Oct. 18, 1854; educated for a civil engineer. In 1882, he took part in a Swedish meteorological expedition to Spitzbergen. In 1884 he was appointed chief engineer to the patent office, and from 1886 to 1889 he occupied a professor's chair at Stockholm. In 1892 he received from the Swedish Academy of Sciences a subvention for the purpose of undertaking scientific aërial navigation. From that time Dr. Andrée devoted himself to aërial navigation, and made his first ascent at Stockholm in the summer of 1893. In 1895 he presented to the Academy of Sciences a well-matured project for exploring the regions of the North Pole with the aid of a balloon. With two companions, Dr. S. T. Strindberg and Herr Fraenckell, he started from Dane's Island, Spitzbergen, July 11, 1897. Two days after his departure, a message was received from Dr. Andrée by carrier pigeon, which stated that at noon, July 13, they were in latitude 82.2°, and longitude 15.5° E., and making good progress to the E., 10° southerly. This was the last word received from the explorer.

ANDREW, the first disciple, and one of the apostles of Jesus. His career after the Master's death is unknown. The an-

niversary of St. Andrew falls on Nov. 30. About 740, St. Andrew became the patron saint of Scotland and he is held in veneration in Russia, as the apostle who, according to tradition, first preached the Gospel in that country.

ANDREW, King of Naples, son of Charobert, King of Hungary, was assassinated with the connivance of his queen in 1345.

ANDREW I., King of Hungary, in 1046-1049; compelled his subjects to embrace Christianity; he was killed in battle in 1058.

ANDREW II., King of Hungary, 1205-1235. He was in the crusades, and displayed great valor in battle; he attempted to ameliorate the condition of his subjects, and died in 1235.

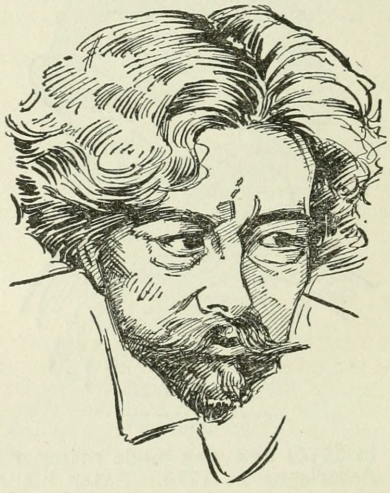
ANDREW III., King of Hungary 1290-1301. He was opposed in his claims to the throne, and involved in a civil war during his reign; he died in 1301.

ANDREW, A(BRAM) PIATT, JR., an American publicist, born in Laporte, Ind., in 1873, and graduated from Princeton University in 1885. He took post-graduate courses in several universities in Europe and became assistant professor of economics at Harvard University in 1900. From 1908 to 1911 he was expert assistant and editor of the publications of the National Monetary Commission, and from 1909 to 1910 was director of the United States Mint. From 1910 to 1912 he was Assistant Secretary of the Treasury, and during the same period served as treasurer of the American Red Cross. He acted as inspector-general in the American Field Service in France and organized the American Volunteer Ambulance and Transport Service. For his services he was awarded the Croix de Guerre by the French Government and received other honors. He wrote much on financial and commercial subjects and published "Banking System and Currency Reform" (1910); "Purpose and Origin of the Proposed Banking Legislation" (1911), etc.

ANDREWS, ELISHA BENJAMIN, an American educator, born in Hinsdale, N. H., Jan. 10, 1844; he was graduated at Brown University, 1870, and Newton Theological Seminary, 1874; President of Brown University in 1889-1898; became Superintendent of Public Schools in Chicago in 1898, and Chancellor of the University of Nebraska in 1900; author of a "History of the United States," "An Honest Dollar: a Plea for Bimetallism," etc. He died in 1917.

ANDREWS, IRENE OSGOOD (Mrs. John B. Andrews), an American social worker, born in Big Rapids, Mich., in 1879. She studied at the University of Wisconsin and at the New York School of Philanthropy, carried on social work in Minneapolis, and was special agent for relief work for the American Red Cross in San Francisco in 1906. In the same year she became factory inspector for Wisconsin and was appointed head resident of the Northwestern University Settlement. She was a member of many economic societies and wrote "Minimum Wage Legislation," "Economic Effects of the War Upon Women and Children in Great Britain," etc. She lectured extensively on labor and economic topics.

ANDREYEV, LEONID, a Russian author, born at Oryol, Russia, 1871. He received his education at the gymnasium at Oryol and St. Petersburg University.



LEONID ANDREYEV

He early turned his attention to literature and speedily achieved an international reputation. His writing was brilliant, but marked by the morbidity characteristic of the Russian school. Among his well-known works may be mentioned "Red Laughter," "Life of Man," and "Anathema." He died suddenly in Finland in February, 1919, from excitement, caused by a Bolshevist raid in the vicinity of his residence.

ANDROMACHE (an-drom'ak-ē), a daughter of Ætion, King of Thebes in Cilicia, and wife of Hector. After the conquest of Troy she became the prize of Pyrrhus, son of Achilles. Euripides has made her the chief character of a tragedy.

ANDROMEDA (an-drom'e-da), in classical mythology a daughter of Cepheus, King of Ethiopia and Cassiope. It was fabled that she was chained to a rock by order of Jupiter Ammon, and then exposed to the attacks of a monster. Perseus released, and afterward married her. On her death she was changed into the constellation which bears her name.

In astronomy, a constellation, fancifully supposed to resemble a woman chained. It is in the northern hemisphere, and is surrounded by Cassiopeia, Lacerta, Pegasus, Pisces, Triangulum, and Perseus. It contains the bright stars Almach and Mirach, and Alpherat is on the boundary line between it and Pegasus. There is in the girdle of Andromeda a fine elliptic nebula visible to the naked eye, and continually mistaken by the uninitiated for a comet. On Sept. 21, 1898, the astronomers of the Pulkowa Observatory in Russia announced that they had discovered a stellated condensation in the center of this nebula, indicating that its nucleus is composed of stars instead of gas, like the matter surrounding it.

In botany, a genus of plants belonging to the order *ericaceæ*, or heath-worts, A species (the *A. polifolia*, or marsh andromeda) occurs in the bogs of Britain. It is an evergreen shrub, with beautiful, rose-colored drooping flowers. Its shoots poison sheep, as do those of the *A. mariana*, which grows in America; and the *A. ovalifolia*, of Nepaul, acts with similar effect upon goats.

ANDRONICUS I. (Comnenus), was one of the most conspicuous characters of his age. In his youth he served against the Turks, in 1141 was for some time a prisoner, and was afterward appointed to a military command in Cilicia, but was unsuccessful. Having engaged in a treasonable correspondence with the King of Hungary, he was thrown into prison by his cousin, the Emperor Manuel; but after 12 years he succeeded in making his escape, and reached Kiev, the residence of Prince Jaroslav. He regained the favor of his cousin by persuading Jaroslav to join him in the invasion of Hungary, but soon incurred his displeasure again, and was sent in honorable banishment to Cilicia. After a pilgrimage to Jerusalem, and his scandalous seduction of Theodora, the widow of Baldwin, King of Jerusalem, he settled among the Turks in Asia Minor, with a band of outlaws, but at length made his peace with the Emperor. After the death of Manuel in 1182, he was recalled to become, first guardian, then colleague, of the young Emperor Alexius II. Soon after, he caused the Empress mother to be strangled, and afterward Alexius himself. His reign, though short, restored prosperity to the provinces; but tyranny and murder were its characteristics in the capital. Isaac Angelus, one of his relatives, having fled to the Church of St. Sophia for sanctuary, a crowd gathered, and a sudden insurrection placed Isaac on the throne, while Andronicus, now 73 years of age, was put to death by the infuriated populace on Sept. 12, 1185.

ANDROS, an island of the Greek Archipelago, the most northern of the Cyclades, separated from Eubœa by a channel, the Doro Channel, 6 miles broad. The island is 25 miles long, and about 10 miles in its greatest breadth, the area being 156 square miles. The soil is remarkably fertile, and wine, silk, olives, and lemons are produced. The chief town, Andros, is situated on a bay of the eastern coast. Pop. (1917) 18,035.

ANDROS ISLANDS, a group of islands belonging to the Bahamas, lying between lat. 23° 41′ and 25° 10′ N.; long. 77° 30′ and 78° 32′ W. The principal island, Andros, is about 70 miles long by 10 broad, at its broadest part. The interior of the largest of these islands is composed of extensive salt marshes and fresh water swamps, in which are islands valuable for their timber; consisting mostly of cedar of superior quality. Pop. about 8,000.

ANDROS, SIR EDMUND, an English provincial governor, born in 1637; was Governor of New York in 1674-1682, and of New England, with New York included, in 1686-1689. His harsh execution of the orders of the Duke of York caused him to be generally execrated, and, after his attempt to deprive Connecticut of its royal charter, he was seized by the people of Boston and sent to England under charges. He was also Governor of Virginia in 1692-1698, and of the Island of Jersey in 1704-1706. He died in 1714.

ANDROSCOGGIN, a river of the United States; rises in the W. of Maine near the N. E. corner of New Hampshire, flows S. partly through New Hampshire, then E., re-entering Maine, then S. and S. E., passing Auburn and Brunswick, and finally joins the Kennebec a few miles above Bath; not navigable.

ANDUJAR, a city in the province of Jaën, Spain; on the Guadalquivir river, 44 miles N. E. of Cordova. Here an engagement took place between the French and Spanish and the convention of Baileu was signed, both in 1808. Pop. about 17.000.

ANEGADA (an-e-gä'da), the most northerly of the Virgin Islands, lying E. of Porto Rico in the West Indies. It contains about 13 square miles, with a scanty population of 200, and belongs to England. A little cotton is grown.

ANEMOMETER, an instrument designed to measure the velocity of the wind. It was invented by Wolfins in 1709. The anemometer most commonly in use consists of four light metallic hemispheres, called (from Dr. Robinson, who first employed them) Robinson's cups, which are made to revolve like a vane or weather-cock, and are found to do so at the rate of exactly one-third the velocity of the wind. The result is then recorded in pencil marks by a self-registering apparatus.

ANEMONE, a genus of plants belonging to the order *ranunculaceæ* or crowfoots. *A. coronaria* and *hortensis* are common garden flowers.

In zoölogy, it is a popular name given to various radiated animals which present a superficial resemblance to the anemone, but really look more like the chrysanthenum or some others of the *compositæ*. The anemone, meaning the sea-anemone, is *A. mesembryanthemum*, called also the bendlet; the snake-locked anemone is the *sagartia viduata*, and the plumose anemone is the *actinoloba dianthus*.

ANEMOSCOPE, an instrument for rendering visible the direction of the wind. In that commonly used there is a vane exposed to the wind acting upon an index moving round a dial-plate on which the 32 points of the compass are engraved.

ANEROID, not containing any liquid; used chiefly in the expression, "aneroid barometer."

An aneroid barometer is a barometer not containing a liquid, but constructed on a totally different principle from a mercurial barometer. Various forms of the instrument exist. One of these consists of a cylindrical metal box exhausted of air, and having its lid of thin corrugated metal. As the pressure increases, the lid which is highly elastic, and has a spring inside, is forced inward; while, again, as it diminishes, it is forced outward. Delicate multiplying levers then transmit these motions to an index which moves on a scale, and is graduated empirically by a mercurial barometer. From its portability it is much used for determining the heights of mountains.

ANEURIN (an-ū'rin), a poet and prince of the Cambrian Britons, who flourished about 600 A. D., author of an epic poem, the "Gododin," relating the defeat of the Britons of Strathclyde by the Saxons at the battle of Cattraeth.

ANEURISM, a morbid dilatation of the aorta, or one of the other great arteries of the body.

ANGARA, a Siberian river which flows into Lake Baikal at its N. extremity, and leaves it near the S. W. end, latterly joining the Yenisei as the Lower Angara or Upper Tunguska.

ANGEL, a messenger, one employed to carry a message, a *locum tenens*, a man of business.

In a special sense an angel is one of an order or spiritual beings superior to man in power and intelligence, vast in number, holy in character, and thoroughly devoted to the worship and service of God, who employs them as his heavenly messengers. Their existence is made known to us by Scripture, and is recognized also in the Parsee sacred books.

The word is also applied to a spirit which has assumed the respect of some human being.

Angel is likewise the name of a beautiful fish, which has its body covered with large green scales, and the laminæ above the gills armed with cerulean spines. It is one of the chætodons, and occurs on the coast of Carolina. It is quite different from the ANGEL FISH (*q. v.*).

In numismatics, an angel is a gold coin, named from the fact that on one side of it was a representation of the Archangel Michael in conflict with the Dragon. The reverse had a ship with a large cross for the mast, the letter E on the right side, and a rose on the left; while against the ship was a shield with the usual arms. It was first struck in France in 1340, and was introduced into England by Edward IV. in 1465. Between his reign and that of Charles I. it varied in value from 6s. 8d. to 10s.

ANGELES, FELIPE, a Mexican soldier who was executed following a court-martial at Chihuahua City, Mexico, on November 26, 1919. Angeles was one of the few well-trained Mexican army officers. He was born in the State of Hidalgo in 1869, and studied military science in France, devoting special attention to artillery. He wrote a military text book which was widely used in Mexico and elsewhere. He joined the revolution of Madero which resulted in the abdication of President Diaz. Under the command of Madero he carried on important operations against the bandit Zapata. After the fall of Madero he refused to support the government of President Huerta and was for a time kept in prison.

He was finally released on condition that he remain in France. When Huerta had ceased to rule, Angeles returned to Mexico and joined the armies of Carranza and Villa. When a division arose between these two he remained with Villa, becoming chief of staff. He was one of the most successful officers operating under Villa, and was notable for his regard for the laws of war. He was captured by Carranza forces during hostilities between Villa and Carranza, in a cave at San Tome where, with four companions, he had taken refuge. After court-martial, he was sentenced to death, in spite of pleas for clemency. See MEXICO.

ANGEL FISH, a fish of the *squalidæ*, or shark family, which derived its name from the fact that its extended pectoral fins present the appearance of wings. It is called also monk-fish, fiddle-fish, shark-ray, and kingston. It is found on the coasts of Europe and North America.

ANGELICA, a genus of plants of the natural order *umbelliferæ*, by some botanists divided into two, *angelica* and *archangelica*. The species are mostly herbaceous and perennial, natives of the temperate and colder regions of the northern hemisphere. Wild angelica (*A. sylvestris*) is a common plant in moist meadows, by the sides of brooks, and in woods in Britain and throughout many parts of Europe and Asia. The garden angelica (*archangelica* or *archangelica officinalis*) is a biennial plant, becoming perennial when not allowed to ripen its seeds. The whole plant, and especially the root, is aromatic and bitter, with a pleasant, somewhat musky color, and contains much resin and essential oil. The garden angelica was at one time also much cultivated for the blanched stalks, which were used as celery now is. The tender stalks and midribs of the leaves, candied, are still, however, a well-known article of confectionery, and an agreeable stomachic; the roots and seeds are employed in the preparation of gin and of bitters. The roots are occasionally ground and made into bread in Norway. and the Icelanders eat the stem and roots raw, with butter. Several species of angelica are natives of North America.

ANGELICO, FRA, the commonest designation of the great friar-painter. Born in 1387 at Vicchio, in the Tuscan province of Mugello, in 1407 he entered the Dominican monastery at Fiesole, in 1436 he was tranferred to Florence, and in 1445 was summoned by the Pope to Rome, where he chiefly resided till his death in 1455. His frescoes are all in Italy—at Cortona, at Fiesole, in the Florentine convent of San Marco, at Orvieto, and in the Vatican chapel of Nicholas V. Of his easel pictures, the Louvre possesses a splendid example, "The Coronation of the Virgin," and the London National Gallery (since 1860) a "Glory," or Christ with 265 saints.

ANGELL, GEORGE THORNDIKE, an American reformer, born in 1832. He was graduated at Dartmouth, 1846, and admitted to the bar, 1851. He has been active in promoting measures for the prevention of crime, cruelties, and the adulteration of food. He founded and was President of the American Humane Educational Society. He died in 1909.

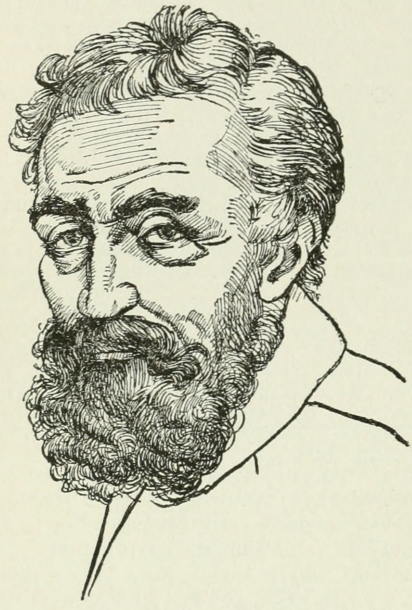
ANGELL, JAMES BURRILL, an American educator and diplomatist, born in Scituate, R. I., Jan. 7, 1829; was graduated from Brown University in 1850. He assumed the presidency of the University of Vermont in 1866, and that of the University of Michigan in 1871. He was Minister to China, 1880-1881, and to Turkey, 1897-1898. In 1900 he resumed the presidency of the University of Michigan. He died in 1916.

ANGELL, JAMES ROWLAND, an American psychologist, born in Burlington, Vt., in 1858, the son of JAMES BURRILL ANGELL (*q. v.*). After graduating from the University of Michigan in 1890, he took post-graduate courses at Harvard and in several German universities, was instructor of philosophy at the University of Minnesota in 1893, and in the following year was appointed assistant professor of psychology and director of the psychological laboratory at the University of Chicago. He became successively associate professor, professor, and head of the department, and dean of the University faculties, the latter in 1911. A member of many philosophical and psychological societies, he was president of the American Psychological Association in 1906. In 1914 he was exchange professor at the Sorbonne, Paris.

ANGELL, NORMAN. See LANE, RALPH NORMAN ANGELL.

ANGELO (MICHAEL ANGELO BUONARROTI), the most distinguished sculptor, painter, and architect of his time and of the modern world, was born on March 6, 1475. His father, Ludovico di Leonardo Buonarroti Simoni, was a poor gentleman of Florence. When the sculptor was born, his father was *podesta*, or mayor, of Caprese and Chiusi, in Tuscany. He returned to Florence when his term of office expired, and the child was intrusted to a stonemason's wife at Settignano. The boy's enthu-

siasm for art revealed itself at an early age, and he was sent to the school of Messer Francesco di Urbino to learn the elements. While yet only 13 years of



MICHAEL ANGELO

age, he entered the *bottega* of Domenico Ghirlandajo, to whom he was bound apprentice for three years. None was ever more fortunate than Michael Angelo in the time and place of his birth. From his boyhood he was familiar with the masterpieces of Donatello, and he joined his contemporaries in making a pilgrimage to the Convent of the Carmine, where he studiously copied the supreme examples of Masaccio's art. By Ghirlandajo he was recommended to Lorenzo de Medici, and entered the school which the "Magnifico" had established in his garden on the Piazza. His talent was not long in arresting the notice of Lorenzo, who henceforth gave him a room in his house and a seat at his table. To this period belong two interesting reliefs. In the "Battle of the Centaurs" (now in the Casa Buonarroti at Florence) the classical influence of Lorenzo's garden is strikingly apparent. A marvellous contrast to the "Centaurs" is the "Madonna," conceived and executed in the spirit of Donatello.

In 1492, when Michael Angelo had spent some three years in his house, Lorenzo died. Pietro, Lorenzo's son and successor, retained for a time the services of Michael Angelo, but he is said to have treated him with scant courtesy; and Michael Angelo fled to Bologna. Nor did he here wait long for a patron; Gianfrancesco Aldrovandi commissioned him to execute a statue. In Bologna the sculptor lingered for a year; then he once more (in 1495) returned to Florence. It was during this sojourn in his native city that he fashioned the marble "Cupid," to which he owed his first introduction to Rome. Baldassare del Milanese persuaded him to give the work the air of an antique by burial, and dispatch it to Rome. Here it was purchased by Cardinal San Giorgio, who, though he speedily discovered the fraud which had been put upon him, was quick to detect the talent of the sculptor who had tricked him. He therefore summoned him to Rome, and on June 25, 1496, Michael Angelo arrived for the first time in the Eternal City. The influence of Rome and the antique is easily discernible in the "Bacchus," now in the National Museum at Florence. To the same period belongs the exquisite "Cupid" of the South Kensington Museum. The "Pieta," which is now in St. Peter's, was executed in 1497, but presents an amazing contrast.

For four years the sculptor remained in Rome, perpetually urged to return to Florence by his father, who, though he objected to his son's craft as unbefitting his station, was nothing loath to profit by the wealth which was the reward of his artistic success. Michael Angelo went back; and Soderini, who was then gonfaloniere, permitted him to convert into a statue the colossal block of marble upon which Agostino d'Antonio had been at work many years before, and out of the irregular block grew the celebrated "David." His "David" is the Gothic treatment of a classic theme. The influence of the antique is obvious, but the personal touch of the sculptor is also apparent. In 1504 it was placed upon its pedestal in the Piazza de' Signori, whence it was removed in 1873 to the Academy of Arts. A second "David" (this time of bronze) was commissioned and sent to France, where all trace of it is lost. The sculptor also designed two marble reliefs, one of which passed into the possession of Sir George Beaumont, and is now at Burlington House. The "Holy Family of the Tribune" and the "Manchester Madonna," in the National Gallery, belong to the same time, and prove that Michael Angelo had not wholly neglected the art of painting. The zeal of Soderini, the gonfaloniere, in the cause of art inspired the scheme of decorating the Great Hall of the Council. For one wall Leonardo da Vinci was commissioned to design a fresco; a sec-

ond was intrusted to Michael Angelo. The latter chose as his subject an incident in the war of Pisa, and executed a cartoon which Vasari, with devout exaggeration, proclaims to have been of divine rather than of human origin. The fresco was never completed, and on the return of the Medici to Florence the cartoon was removed to the hall of their palace, to which painters were permitted unrestrained access. The result was that over-zealous admirers of Michael Angelo cut the cartoon to pieces.

In 1503 Julius II. succeeded to the pontificate, and summoned Michael Angelo to Rome. The sculptor could as little brook opposition as the Pope, and their dealings were continually interrupted by bitter quarrels and recriminations. The Pope commissioned the sculptor to design his tomb. For 40 years Michael Angelo clung to the hope that he would yet complete the great monument in honor of Pope Julius and his own genius. But intrigue and spite were too strong for him. Other demands were continually made upon his energy, and the sublime statue of Moses is the best fragment that is left to us of the tomb of Julius. Various difficulties arose between the Pope and the sculptor. Instead of being allowed to work on the monument, Michael Angelo was ordered to decorate the ceiling of the Sistine Chapel. In 1508 Michael Angelo began this work for which his training had ill adapted him. However, he set himself resolutely to the toil, and in four years achieved a masterpiece of decorative design. Michael Angelo, however, had not forgotten the monument of Pope Julius, and no sooner had he finished his work in the Sistine Chapel than he returned with eagerness to the tomb.

In 1513 Pope Julius II. died, and, though he had commanded the cardinals, Santi Quattro and Aginense, to see that his monument was completed in accordance with his expressed wishes, the cardinals were thrifty men, and demanded a more modest design. This was furnished, but before the work could be undertaken, Pope Leo X. had dispatched Michael Angelo on business of his own to Florence. Leo was of the Medici family, and professed no interest in the tomb of his predecessor; his whole anxiety was to do honor to his ancestors by the adornment of Florence. He therefore, commissioned Michael Angelo to rebuild the façade of the Church of San Lorenzo and enrich it with sculptured figures. For eight years Michael Angelo was forced to devote himself to toil as idle as that of Sisyphus. The sculptor remained in Florence still working on the tomb of Julius and building the Sacristy of San Lorenzo. In 1528 the unsettled state of his native city turned him again from the practice of his art. He devoted himself heart and soul to the science of fortification, and when, in 1529, Florence was besieged, Michael Angelo was foremost in its defense. The city was forced to surrender in the following year. He resumed his work upon the tombs of the Medici, and completed the monuments to Giuliano and Lorenzo de Medici, which are among the greatest of his works. In 1537 he began to paint "The Last Judgment" for the Sistine Chapel, which was finished and displayed on Christmas Day, 1541, and was the master's last pictorial achievement. In the following year he was appointed architect of St. Peter's. To this work he devoted his wonderful genius with zeal and loyalty and for almost all that is best in this remarkable edifice we are indebted to him. While still engaged in this work, he died on Feb. 18, 1564.

ANGELUS, in the Roman Catholic Church, a short form of prayer in honor of the incarnation, consisting mainly of versicles and responses, the angelic salutation three times repeated, and a collect, so named from the word with which it commences, *Angelus Domini* (Angel of the Lord). Hence, also, the bell tolled in the morning, at noon, and in the evening to indicate the time when the angelus is to be recited.

ÅNGERMAN-ELF, the most beautiful river in Sweden, flows S. E. through Westerbotten and West Norrland into the Gulf of Bothnia at Hernösand; navigable from Sollefteå downward (about 65 miles).

ANGERS (an-zhā'), a town and river-port of France, capital of the Department of Maine-et-Loire, and formerly of the province of Anjou, on the banks of the Maine, 150 miles S. W. of Paris. Has an old castle, now used as a prison, a fine cathedral of the 12th and 13th centuries, with very fine old painted windows; is the seat of a bishop, and has a school of arts and manufactures, the remains of a hospital founded by Henry II. of England in 1155, etc.; manufactures sail cloth, hosiery, leather, and chemicals, foundries, etc. In the neighborhood are immense slate quarries. Pop. about 85,000.

ANGILBERT, ST. (äng-ēl-bār'), the most celebrated poet of his age, secretary and friend of Charlemagne, whose daughter, Bertha, he married. In the

latter part of his life he retired to a monastery of which he became abbot. Died in 814.

ANGINA PECTORIS, the name first given by Dr. Heberden in 1768, and since then universally adopted as the designation of a very painful disease, called by him also a disorder of the breast; by some others, spasm of the chest, or heart stroke, and popularly breast pang. It is characterized by intense pain in the præcordial region, attended by a feeling of suffocation and a fearful sense of impending death. These symptoms may continue for a few minutes, half an hour, or even an hour or more. During the paroxysm the pulse is low, with the body cold, and often covered with clammy perspiration. There are several varieties of it: an organic and functional form; and again a pure or idiopathic and a complex or sympathetic one have been recognized. Angina is produced by disease of the heart.

ANGIOSPERM, a term for any plant which has its seeds inclosed in a seed vessel. Exogens are divided into those whose seeds are inclosed in a seed vessel, and those with seeds produced and ripened without the production of a seed vessel. The former are angiosperms, and constitute the principal part of the species, the latter are gymnosperms, and chiefly consist of the *coniferæ* and *cycadeceæ*.

ANGLE, the point where two lines meet, or the meeting of two lines in a point. Technically, the inclination of two lines to one another. Angles may be ranked under two leading divisions, plane and solid angles. A plane angle is the inclination of two lines to one another in a plane, which two lines meet together. A solid angle is that which is made by the meeting in one point of more than two plane angles, which, however, are not in the same plane. Each of the leading divisions, plane and solid angles, may again be subdivided into rectilineal, curvilineal, and mixed angles. A plane rectilineal angle is the inclination to each other of two straight lines, which meet together, but are not in the same straight line. A curvilineal angle is the inclination to each other of two curved lines which meet in a point. A mixed angle is one formed by the meeting of a curve and a straight line.

Angles are measured by arcs, and it is immaterial with what radius the latter are described. The result is generally stated in degrees, minutes, and seconds. The point at which the lines forming the angle meet is called the angular point or the vertex of the angle, and the lines themselves the sides or legs of the angle.

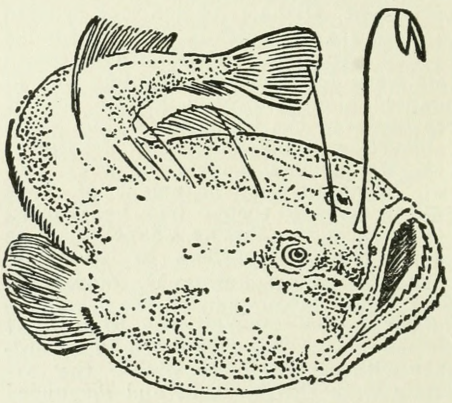
Plane rectilineal angles are generally divided into right and oblique, or into right, obtuse, and acute. When a straight line standing upon another straight line makes the two adjacent angles (those on the right and left of it) equal to one another, each of them is called a right angle. An oblique angle is one which is not a right angle. An obtuse angle is that which is greater than one right angle, but less than two. An acute angle is that which is less than a right angle: both are oblique. A spherical angle is one formed by the intersection or the meeting of two great circles of a sphere.

In mechanics, there are angles of direction, of friction, of repose, etc.

Optics has angles of incidence, of reflection, of refraction, of deviation, of polarization, etc.

Astronomy has angles of position, of situation, of elevation, inclination, depression, etc.

ANGLER FISH, a fish called also sea devil, frog, or frog fish; and in Scotland, wide-gab, signifying wide mouth. It is the *lophius piscatorius* of Linnæus. It has an enormous head, on which are



ANGLER FISH

placed two elongated appendages, or filaments. These, being movable, are maneuvered as if they were bait; and when small fishes approach to examine them, the angler, hidden amid mud and sand, seizes them at once; hence its name. It occurs along the British coasts, and is three, or, occasionally, five, feet long.

ANGLES, a Low German tribe, who, in the earliest historical period, had their seats in the district about Angeln, in the Duchy of Schleswig, and who in the 5th century and subsequently crossed over

to Britain along with bands of Saxons and Jutes (and probably Frisians also), and colonized a great part of what from them has received the name of England, as well as a portion of the lowlands of Scotland. The Angles formed the largest body among the Germanic settlers in Britain, and founded the three kingdoms of East Anglia, Mercia, and Northumbria.

ANGLESEY (ang'gl-se), or **ANGLESEA** ("the Angles' island"), an island and county of north Wales, in the Irish Sea, separated from the mainland by the Menai strait; 20 miles long and 17 miles broad; area, 275 square miles. The chief agricultural products are oats and barley, wheat, rye, potatoes, and turnips. Numbers of cattle and sheep are raised. Anglesey yields a little copper, lead, silver, ochre, etc. The chief market-towns are Beaumaris, Holyhead, Llangefni, and Amlwch. The county returns one member to Parliament. Pop. about 51,000.

ANGLIA, EAST, a kingdom founded by the ANGLES (*q. v.*) about the middle of the 6th century, in the eastern part of central England, in what forms the present counties of Norfolk and Suffolk. At first to some extent dependent on Kent, and afterward on Mercia, on the fall of the latter it was attached to Wessex, without, however, losing its own kings until the time of the Danish invasion, when it was seized by the invaders and formed into a Danish kingdom under Guthrum (878). Edward, the son and successor of Alfred, after a long struggle, forced the Danes to acknowledge him in 921. Under him Wessex grew to be England, and East Anglia was henceforward part and parcel of the kingdom. It was one of the four great earldoms of the kingdom under Canute.

ANGLICAN CHURCH, THE, means collectively that group of autonomous churches which are in communion with, or have sprung from, the mother Church of England. They are the following: The Church of Ireland, the Episcopal Church of Scotland, the Protestant Episcopal Church of the United States of America, the Church of Canada, the Church of Australia, the Indian Church, and the Church of South Africa, which are all autonomous bodies under the jurisdiction of their own metropolitans, and not amenable to the ecclesiastical courts of the Church of England, though they all look to the Archbishop of Canterbury as patriarch. In addition to these autonomous churches in connection with the Anglican communion, there are 12 missionary bishops, representing the English Church in various remote regions of Asia, Africa, and America; and three or four representing the Protestant Episcopal Church of America. See PROTESTANT EPISCOPAL CHURCH; REFORMED EPISCOPAL CHURCH.

ANGLIN, MARGARET FRANCES MARY, an actress born in Ottawa, Canada, in 1876. She was educated in a convent and studied at the Empire School of Dramatic Acting in New York. She first appeared on the stage in 1894. Afterward she was leading lady with many well-known actors, including E. H. Sothern, Richard Mansfield, and Henry Miller, and became one of the best-liked actresses on the American stage. She visited Australia and other foreign countries. Among the most important plays in which she appeared were "Cyrano de Bergerac," "The Only Way," "The Great Divide," "Taming of the Shrew," "Twelfth Night," and revivals of several Greek tragedies.

ANGLING, the art of catching fish with a hook, or angle (Anglo-Saxon ongel), baited with worms, small fish, flies, etc. We find occasional allusions to this pursuit among the Greek and Latin classical writers. The oldest work on the subject in English is the "Treatyse of Fysshinge with an Angle," printed by Wynkyn de Worde in 1496. Walton's inimitable discourse on angling was first printed in 1653.

The chief appliances required by an angler are a rod, line, hooks, and baits. Rods are made of various materials, split-bamboo being preferred by experts. In length they may vary from 10 feet to more than double, with a corresponding difference in strength—a rod for salmon being necessarily much stronger than one suited for ordinary brook trout. The reel, an apparatus for winding up the line, is attached to the rod near the lower end, where the hand grasps it while fishing. The best are usually made of brass, are of simple construction and so made as to wind or unwind freely and rapidly. That part of the line which passes along the rod and is wound on the reel is called the reel line, and may vary from 20 to 100 yards in length, according to the size of the water and the habits of the fish angled for; it is usually made of twisted horse hair and silk, or of oiled silk alone. The casting line, which is attached to this, is made of the same materials, but lighter and finer. To the end of this is tied a piece of fine gut, on which the hook, or hooks, are fixed. The casting or gut lines should decrease in thickness from the reel line to the hooks.

The hook, of finely tempered steel, should readily bend without breaking, and yet retain a sharp point. It should be long in the shank and deep in the bend; the point straight and true to the level of the shank; and the barb long. Floats formed of cork, goose and swan quills, etc., are often used to buoy up the hook so that it may float clear of the bottom. For heavy fish or strong streams a cork float is used; in slow water and for lighter fish quill floats. Baits may consist of a great variety of materials, natural or artificial. The artificial flies so much used in angling for trout and salmon are composed of hairs, furs and wools, of every variety, mingled with pieces of feathers, and secured together by plated wire, or gold and silver thread, marking silk, wax, etc. Artificial minnows, or other small fish, are also used by way of bait, and are so contrived as to spin rapidly when drawn through the water in order to attract the notice of the fish angled for.

ANGLO-JAPANESE TREATY, an agreement entered into by England and Japan, Jan. 30, 1902. Its primary object was the safeguarding of the interests of both nations in China and Korea. The unquestioned military primacy of Japan in Asia, together with her close proximity to China and Korea, combined with British naval strength, made the alliance a powerful one. It was declared in the treaty that neither of the contracting powers was influenced by any designs of aggression in the countries named, and it was promised that equal opportunities should exist in China and Korea to carry on commerce with all nations. The peculiar interests of Japan in Korea were emphasized, and aid was promised by each nation to the other in the event of disorders arising, or if aggressive action should be taken by any other power in the countries named, and the contracting parties agreed to make war and conclude peace in common.

On Aug. 12, 1905, a new treaty was signed at London that superseded the earlier one. Nothing in the first treaty was abrogated, but an additional pact was made that the sphere of mutual action and support should include the regions of eastern Asia and of India. The effect of this superseding treaty was to maintain the status quo in practically all parts of Asia, with the exception of Turkey. The treaty was to run for a period of ten years and could be abrogated before the expiration of its term by either nation, on a year's notice to the other. The treaty in general was not objected to by other nations, with the possible exception of Russia, whose designs against Afghanistan and India, if they existed, the treaty was evidently intended to thwart. This treaty was renewed for 10 years on July 13, 1911, at which time, at the demand of Great Britain, a clause was added providing that neither of the two parties was to be forced to go to war with any other power with whom either of the two contracting parties might have concluded a treaty of general arbitration. The Anglo-Japanese treaty was one of the reasons why Japan eventually entered the World War on the side of the Allies.

ANGLO-PERSIAN TREATY, an agreement entered into Aug. 9, 1919, at Teheran, capital of Persia, between Great Britain and Persia in regard to the future relation of the two countries. The text of the documents was published in England on Aug. 16. There were two main features of the instrument: one was an agreement on the part of Great Britain to furnish, at Persia's expense, military officers, munitions, and equipment for an army that should maintain order in Persia and on her frontiers. The second offered a loan to Persia of £2,000,000, which was to be redeemable in 20 years and take priority over all other debts, except a previous loan for a smaller amount. The loan was to bear interest at 7 per cent., and as collateral Persia pledged her customs receipts. Accompanying the agreement, and practically a part of it, were letters from the British representative offering to aid Persia in recovering her war claims, and in the adjustment of her boundaries.

Considerable criticism arose in other countries as soon as the terms of the agreement were made known. The treaty was strongly attacked in the French press, which claimed that Great Britain had obtained a virtual protectorate over Persia. It was pointed out that the treaty had been concluded without first having been submitted to the League of Nations. It was alleged that Persian sovereignty had been practically destroyed. In commercial circles the agreement was looked at askance as an attempt to assure British control over the Persian oil fields and other great natural resources. British officials, however, asserted that Persian independence was not jeopardized by the agreement, and denied any purpose of creating a protectorate. The Persian Foreign Minister, speaking in behalf of his government, declared that the independence of Persia was not imperilled by the agreement, and that it gave Great Britain no permanent rights or monopolies.

ANGLO-SAXON, pertaining to the Anglo-Saxons or one of the Anglo-Saxon race—that is, of the mingled Anglo-Saxons and other Teutonic tribes from whom the English, the Lowland Scotch, a great proportion of the present inhabitants of Ulster, and the mass of the population in the United States and various British colonies sprung.

The word is also applied to the language originally spoken by the race.

The Anglo-Saxon tongue did not pass directly into the English. The Norman conquest introduced a new element into the language, and produced temporary confusion. When this began to pass away, and it became evident that the tongue of the conquered rather than that of the conquerors was destined ultimately to prevail, it was not the old Anglo-Saxon, pure and simple, which remained. There came in place of it various dialects, especially a midland, a northern and a southern one. It was a mixed dialect, mainly midland, but also slightly southern, which with Chaucer, in the 14th century, became the standard language; and at last, by a series of insensible changes, developed into the modern English tongue.

ANGOLA, a name formerly given to the west African coast from Cape Lopez to Benguela, but now applied to the Portuguese west African possessions, extending from the Kongo river southward to the Cunene, which, at its mouth, notes the boundary between the Portuguese and former German territories. This region is divided into 9 districts. Capital, St. Paul de Loanda. Portuguese influence extends some 1,500 miles inland. The area is estimated at almost 500,000 square miles. Estimates of the population vary from 2,200,000 to 4,200,000. There are over 800 miles of railroads. The coast strip is level, hot and unhealthy, but beyond is hilly country. The main rivers are the Kwango running N. to the Kongo, and the Coanza and Cunene, running W. to the Atlantic. The country is well watered, and has a luxuriant vegetation of the tropical African type. Yams, tobacco, indigo, rice, cotton, and sugar are freely produced. Wax, Buffalo hides, ivory, copal gum, and palm oil are exported. Iron is found in the mountains; and copper, lead, sulphur, and petroleum are obtained. Horses and camels cannot live here; the ox is ridden, but the burden-bearers are usually men. Angola was long notorious for its great slave trade. The natives are Kongo negroes, and belong to the great Bantu stock. The Portuguese under Diego Cam discovered this coast, in 1486, and soon began to settle in it; but St. Paul de Loanda was not built till 1578. In the course of the war of 1914-1918, the British in their west African campaign forced the Germans to seek refuge in Angola, where they were interned.

ANGORA, a town in the interior of Asiatic Turkey, 215 miles E. S. E. of Constantinople, with considerable remains of Byzantine architecture, and relics of earlier times, both Greek and Roman, such as the remnants of the Monumentum Ancyranum, raised in honor of the Emperor Augustus. All the animals of this region are long-haired, especially the goats, sheep, and cats. This hair forms an important export as well as the fabric called camlet, here manufactured from it; other exports being goats' skins, dye stuffs, gums, honey and wax, etc. Pop. about 35,000.

ANGORA CAT, the large and long-haired white variety of the common cat, said to belong originally to Angora. It has a superb coat of long silky hair and a long bushy tail.

ANGORA GOAT, a variety of the common goat with long, silky hair. There are two or three varieties of the breed. The animal's coat is composed of two sorts of material—one hairy, short, and close to the skin; the other longer and woolly, farther from the skin. The latter is the most plentiful and most valuable. Of this goat's hair, often called camel's wool, camlets are extensively manufactured here. The Angora goat is bred for his hair, called Mohair in the United States and in Cape Colony, and has also been introduced into Australia.

ANGOSTURA, or **CIUDAD BOLIVAR**, city and capital of the state of Bolivar, Venezuela; on the Orinoco river; 263 miles S. E. of Caracas. It has considerable export trade in cotton, indigo, coffee, tobacco, cattle, etc. Pop. about 20,000.

ANGOSTURA BARK, the aromatic, bitter medicinal bark obtained chiefly from *galipea officinalis*, a tree of 10 to 20 feet high, growing in the northern regions of South America; natural order *rutaceæ*. The bark is valuable as a tonic and febrifuge.

ANGOULÊME (än-gö-lām'), the capital of the French department of Charente, and formerly the province of Angoumois, 83 miles N. E. of Bordeaux by rail. It contains a fine Romanesque cathedral (1136), and a striking hotel de ville, with which is incorporated the remnant of the ancient castle of Angoulême, where was born the celebrated Mar-

guerite of Navarre. There are manufactures of machinery, paper, and wire, and a brisk trade in brandy. Pop. about 40,000.

ANGOULÊME, LOUIS ANTOINE DE BOURBON, DUC D', the eldest son of Charles X. of France, and Dauphin during his father's reign, born at Versailles, Aug. 6, 1775. At the Revolution he retired from France with his father, and after abortive military operations at the head of a body of French *émigrés* in 1792, lived with the royal exiles on the Continent, and later in England. In 1799 he married his cousin, Marie Thérèse, the only daughter of Louis XVI. and Marie Antoinette. Louis XVIII. appointed him lieutenant-general of the kingdom; and, when Napoleon returned from Elba, he made a weak attempt to oppose him, but, deserted by his troops, was forced to surrender. In 1823 he led the French army of invasion into Spain. On the revolution in July, 1830, he signed, with his father, an abdication in favor of his nephew, the Duc de Bordeaux; and when the Chambers declared the family of Charles X. to have forfeited the throne, he accompanied him into exile, to Holyrood, to Prague, and to Görz, where he died June 3, 1844.

ANGRA, the capital of the Azores, a seaport at the head of a deep bay on the S. coast of the island of Terceira. It is a station for ships between Portugal and Brazil and the East Indies. It is the seat of the governor-general and of a bishop; has fine churches, and is strongly fortified. Pop. about 12,000. There is a considerable export of wine, cheese, honey, and flax.

ANGRA-PEQUEÑA (än'grä-pe-kā'-na), a bay on the S. W. coast of Africa. It gives name to the southern littoral of Great Namaqualand, extending 200 miles from 26° S. lat. to the Orange river, or Cape Colony, and reaching 90 miles inland. In 1883 Angra-Pequeña was ceded by a Namaqua chieftain to Lüderitz, a Bremen merchant; and next year it was taken under German protection, with all the coast to the N. as far as Cape Frio, except Walfisch Bay, which belongs to England. It formed the beginning of what later became German Southwest Africa. The Germans called it Lüderitz Bay and the surrounding country Lüderitzland. Together with the rest of German Southwest Africa the Union of South Africa, by the decision of the Peace Conference of May 7, 1919, assumed a mandate over this former German possession. During the World War it had been one of the landing points for the forces sent from the Union of South Africa to invade German Southwest Africa.

ANHALT, a former duchy of north Germany, almost surrounded by Prussia; area 888 square miles. All sorts of grain, wheat especially, are grown in abundance; also, flax, rape, potatoes, tobacco, hops, and fruit. The inhabitants are principally occupied in agriculture, though there are some iron works and manufactures of woolens, linens, beet-sugar, tobacco, etc. The former Dukes of Anhalt trace their origin to Bernard (1170-1212), son of Albert the Bear. In common with the other German states, Anhalt, in November, 1918, was declared a republic. Pop. about 350,000. The chief towns are Dessau (pop. about 60,000), Bernburg (pop. about 35,000), Köthen, and Zerbst.

ANHYDRIDE, or anhydrous acid, a chemical substance formed by the substitution of an acid radical for the whole of the hydrogen in one or two molecules of water. By the action of water they are converted into acids.

ANHYDRITE, an anhydrous calcium sulphate, classed by Dana under his celestite group. It is divided by Dana into Var. 1. Ordinary: (a) crystallized; (b) fibrous; (c) fine granular; (d) scaly granular, under which is ranked vulpinite. Var. 2. Pseudomorphous. It occurs in various parts of Europe and in North America.

ANI, the name given to the birds belonging to the genus *crotophaga*, and indeed to those ranked under the sub-family *Crotophaginæ*, a division of the *Cuculidæ*, or cuckoos; the typical anis, those of the genus *crotophagæ*, are found in South America, the West Indies and Florida. They are about the size of our blackbird.

ANILINE. See DYEING.

ANIMAL, an organized and sentient living being. Life in the earlier periods of natural history was attributed almost exclusively to animals. With the progress of science, however, it was extended to plants. In the case of the higher animals and plants there is no difficulty in assigning the individual to one of the two great kingdoms of organic nature, but in their lowest manifestations, the vegetable and animal kingdoms are brought into such immediate contact that it becomes almost impossible to assign them precise limits, and to say with certainty where the one begins and the other ends.

With regard to internal structure no line of demarkation can be laid down, all plants and animals being, in this respect, fundamentally similar; that is, alike composed of molecular, cellular, and fibrous tissues. Neither are the chemical characters of animal and vegetable substances more distinct. Animals contain in their tissue and fluids a larger proportion of nitrogen than plants, while plants are richer in carbonaceous compounds than the former. Power of motion, again, though broadly distinctive of animals, cannot be said to be absolutely characteristic of them. Thus many animals, as oysters, sponges, corals, etc., in their mature condition are rooted or fixed, while the embryos of many plants, together with numerous fully developed forms, are endowed with locomotive power by means of vibratile, hair-like processes called cilia.

The distinctive points between animals and plants which are most to be relied on are those derived from the nature and mode of assimilation of the food. Plants feed on inorganic matters, consisting of water, ammonia, carbonic acid, and mineral matters. They can only take in food which is presented to them in a liquid or gaseous state. The exceptions to these rules are found chiefly in the case of plants which live parasitically on other plants or on animals, in which cases the plant may be said to feed on organic matters, represented by juices of their hosts. Animals, on the contrary, require organized matters for food. They feed either upon plants or upon other animals. Animals require a due supply of oxygen gas for their sustenance, this gas being used in respiration. Plants, on the contrary, require carbonic acid. The animal exhales or gives out carbonic acid as the part result of its tissue waste, while the plant taking in this gas is enabled to decompose it into its constituent carbon and oxygen. The plant retains the former for the uses of its economy, and liberates the oxygen, which is thus restored to the atmosphere for the use of the animal. Animals receive their food into the interior of their bodies, and assimilation takes place in their internal surfaces. Plants, on the other hand, receive their food into their external surfaces, and assimilation is effected in the external parts, as are exemplified in the leaf surfaces under the influence of sunlight. All animals possess a certain amount of heat or temperature which is necessary for the performance of vital action. The only classes of animals in which a constantly elevated temperature is kept up are birds and mammals.

ANIMAL CHEMISTRY, the department of organic chemistry which investigates the composition of the fluids and the solids of animals, and the chemical action that takes place in animal bodies.

ANIMALCULE, a general name given to many forms of animal life from their minute size.

ANIMAL KINGDOM, one of the three great kingdoms of visible nature, the two other being the vegetable and the mineral kingdoms. Prof. Owen, in his "Paleontology," adopts the following classification: Kingdom I., protozoa. Kingdom II., animalia. Sub-kingdom I., invertebrata: Province 1, radiata; 2, articulata; 3, mollusca. Sub-kingdom II., vertebrata. Prof. Huxley, writing in 1869, divided the animal kingdom in eight groups arranged thus:

VERTEBRATA,

MOLLUSCA,	ANNULOSA,
MOLLUSCOIDA,	ANNULOIDA,
CŒLENTERATA,	INFUSORIA,

PROTOZOA.

ANIMAL MAGNETISM, a science, or art, so called because it was believed that it taught the method of producing on persons of susceptible organization effects somewhat similar to those which a magnet exerts upon iron.

ANIMAL PSYCHOLOGY, the study of mind as it is found in animals below man. It is sometimes called comparative psychology, although that term more probably belongs in the comparative study including man. The study is carried on in general by the observation of the behavior of animals under various conditions, in the study of their nervous structure, and in the interpretation of the facts derived in these studies as indicators of mind.

ANIMAL WORSHIP. See RELIGION.

ANIO, now **ANIENE** or **TEVERONE**, a river in Italy, a tributary of the Tiber, which it enters above Rome, renowned for the valley through which it flows, where stand the remains of the villas of Mæcenas and the Emperor Hadrian. Its famous waterfalls at Tivoli now furnish valuable electric energy which is transmitted to Rome.

ANISE, an umbelliferous plant, the *pimpinella anisum*. It is cultivated in southern Europe and in Germany for the sake of the seeds, which are exported. They are aromatic and carminative.

Oil of anise is a solution of anise camphor. The camphor is obtained pure

from alcohol by pressure and crystallization. In pharmacy it is used as a stimulant, aromatic, and carminative.

ANJOU (än-zhö′), an ancient province of France, now forming the department of Maine-et-Loire, and parts of the departments of Indre-et-Loire, Mayenne, and Sarthe; area, about 3,000 square miles. In 1060 the province passed into the hands of the house of Gatinais, of which sprang Count Godfrey V., who, in 1127, married Matilda, daughter of Henry I. of England, and so became the ancestor of the Plantagenet kings. Anjou remained in the possession of the English kings up to 1204, when John lost it to the French King, Philip Augustus. In 1226 Louis VIII. bestowed the province on his brother Charles; but in 1328 it was reunited to the French crown. John I. raised it to the rank of a ducal peerage, and gave it to his son Louis. Henceforth it remained separate from the French crown till 1480, when it fell to Louis XI. The last Duke of Anjou was the grandson of Louis XIV., Philip V. of Spain.

ANKOBAR, the former capital of the kingdom of Shoa, in Abyssinia; is built 8,200 feet above sea-level. Pop. 2,000.

ANN, ST., a name applied to a number of places in various parts of the world. The best known and most worthy of notice are (1) St. Ann Shoals, off the S. part of the coast of Sierra Leone, extending from Cape Shilling to Sherboro Island, a distance of between 30 and 40 miles. (2) St. Ann (Cape), the extreme N. W. point of Sherboro Island, coast of Sierra Leone; lat. 7° 34′ N.; long., 12° 57′ W.; having close by a group of islands called Turtle Islands. (3) St. Ann's, a town, river, and bay, Jamaica, on the N. coast; the latter in lat. 18° 20′ N.; long. 77° 13′ W. (4) A cape or headland on the N. W. coast of Africa, about 35 miles S. S. E. of South Cape Blanco, near Arguin, and within the bank of that name: lat. 20° 30′ N.; long. 17° 0′ W. (5) A lake, Upper Canada, 20 miles long, and 20 broad, about 45 miles N. of Lake Superior, with which it has communication by the Nipigon river. (5) A harbor on the E. side of Cape Breton, British America; lat. 46° 21′ N.; long. 60° 27′ W.

ANNA COMNENA, daughter of Alexius Comnenus I., Byzantine emperor. She was born in 1083, and died in 1148. After her father's death she endeavored to secure the succession to her husband, Nicephorus Briennius, but was baffled by his want of energy and ambition. She wrote (in Greek) a life of her father, Alexius, which, in the midst of much fulsome panegyric, contains some valuable and interesting information.

ANNA IVANOVNA (-wan-ö′na), Empress of Russia, born in 1693; the daughter of Ivan, the elder half-brother of Peter the Great. She was married in 1710 to the Duke of Courland, in the following year was left a widow, and, in 1730 ascended the throne of the Czars on the condition, proposed by the Senate, that she would limit the absolute power of the czars, and do nothing without the advice of the Council. This promise she did not keep. She chose as her favorite, Ernest John von Biren or Biron, who was soon all-powerful in Russia. Leading nobles were executed and thousands of men were sent to Siberia. In 1737 Anna forced the Courlanders to choose Biren as their duke, and nominated him at her death Regent of the Empire during the minority of her grand-nephew, Prince Ivan of Brunswick. Anna died in 1740.

ANNAM. See ANAM.

ANNAPOLIS, city, port of entry, capital of the State of Maryland, and county-seat of Anne Arundel co.; on the Severn river, near Chesapeake Bay, and several railroads; 40 miles E. of Washington, D. C. It is in a fruit and berry-growing region; has oyster-packing plants, marine railway, glass factory, a National bank, daily, weekly, and other periodicals; and is widely known as the seat of the United States Naval Academy. The city also contains St. John's College, several State buildings, convent, a house of Redemptorist Fathers, residences of many naval officers and of families of officers on sea duty, and bronze statues of General John de Kalb and Chief Justice Roger B. Taney. The city was founded in 1649; was first named Providence; and received a city charter and its present name, in honor of Queen Anne, in 1708. The first Federal Constitutional Convention was held here in 1786, and Washington surrendered his commission in the army in the Senate room of the State House. Pop. (1910) 8,609; (1920) 11,214.

ANN ARBOR, city and county-seat of Washtenaw co., Mich.; on the Huron river and the Michigan Central railroad; 38 miles W. of Detroit. It is in an agricultural region; has National banks, high school, manufactories of farming implements, woolen goods, furniture, carriages, and organs, daily, weekly, and monthly periodicals, and is the seat of the University of Michigan. Pop. (1910) 14,817; (1920) 19,516.

ANNATO, or **ARNOTTO**, an orange-red coloring matter, obtained from the pulp surrounding the seeds of *bixa orellana*, a shrub native to tropical America, and cultivated in Guiana, St. Domingo, and the East Indies. It is sometimes used as a dye for silk and cotton goods, but it is much used in medicine for tinging plasters and ointments, and to a considerable extent by farmers for giving a rich color to cheese.

ANNE BOLEYN. See BOLEYN, ANNE.

ANNE OF AUSTRIA, daughter of Philip III. of Spain, was born at Madrid in 1602, and in 1615 was married to Louis XIII. of France. Richelieu, fearing the influence of her foreign connections, did everything he could to humble her. In 1643 her husband died, and she was left regent, but placed under the control of a council. The parliament intrusted her with full sovereign rights during the minority of her son, Louis XIV. She incurred the hatred of the nobles by her boundless confidence in Cardinal Mazarin, and was forced to flee from Paris during the wars of the Fronde. She ultimately quelled all opposition, and was able, in 1661, to transmit to her son, unimpaired, the royal authority. She died in 1666.

ANNE, QUEEN OF GREAT BRITAIN AND IRELAND, was born at Twickenham, near London, Feb. 6, 1664; the second daughter of James II., then Duke of York, and Anne Hyde, his first wife, daughter of the Earl of Clarendon. In 1683 she was married to Prince George, brother to King Christian V. of Denmark. On the arrival of the Prince of Orange in 1688, Anne wished to remain with her father; but she was prevailed upon by Lord Churchill (afterward Duke of Marlborough) and his wife to join the triumphant party. After the death of William III., in 1702, she ascended the English throne. Her character was essentially weak, and she was governed first by Marlborough and his wife, and afterward by Mrs. Masham. Most of the principal events of her reign are connected with the War of the Spanish Succession. The only important acquisition that England made by it was Gibraltar, captured in 1704. Another very important event was the union of England and Scotland, under the name of Great Britain, in 1707. She died in 1714. The reign of Anne was distinguished for the number of admirable writers who flourished at this time, such as Pope, Swift, and Addison.

ANNEALING, a process to which many articles of metal and glass are subjected after making, in order to render them more tenacious, and which consists in heating them and allowing them to cool slowly.

ANNELIDA, a class of animals belonging to the sub-kingdom *articulata*, the annulosa of some naturalists. They are sometimes called red-blooded worms, being the only invertebrated animals possessing this character. They are soft-bodied animals, mostly living in the water, sometimes in moist earth, but never parasitically within the bodies of other animals; the higher ones possessing limbs, though of a rudimentary character, which makes them resemble centipedes; while the lower ones, like the leeches, are wholly destitute of these appendages. The respiration is effected by external branchiæ, by internal vesicles, or by the skin itself. Contractile vessels supply the place of a heart. The nervous system consists of a single or double ventral cord, furnished with ganglia at intervals, and surrounding the œsophagus above.

ANNEXATION, the term applied to the acquisition by a country of territory which was formerly independent or was possessed by another country. The term is applied more properly to the acquisition of adjoining territory, but has come to be used in a broader sense, and is now applied to any territory added to an existing state. Among the most notable annexations are those of Alsace-Lorraine to Germany in 1870; of California to the United States, as a result of the Mexican War; of the South African states as a result of the Boer War; and the changes of territory resulting from the defeat of Germany in the World War. The inhabitants of annexed territory are absolved from allegiance to their former sovereign. Titles to property are not affected, except in the substitution of the new sovereign for the old. Annexation is brought about by treaty, by proclamation, or by legislative act. It may be made complete in spite of the active or passive opposition of the inhabitants of the territory affected.

ANNISTON, a city of Calhoun co. in Alabama, on the Louisville and Nashville, and the Southern railroads; about 60 miles E. by N. of Birmingham. It is in one of the most important coal and iron mining regions of the country; is a trade center for cotton and agricultural products; and is noted for its manufactures of iron and steel, cotton goods, bricks, cordage, and other articles. Anniston is the seat of Alabama Presbyte-

rian College and Barber Memorial Seminary and the Noble Female Institute; is a popular summer and winter resort; and has National banks and daily and weekly periodicals. Pop. (1910) 12,794; (1920) 17,734.

ANNO DOMINI, A. D., the year of Our Lord, of grace, of the incarnation, of the circumcision, and of the Saviour's crucifixion. The Christian era began Jan. 1, in the middle of the fourth year of the 194th Olympiad, the 753d year of the building of Rome, and in 4714 of the Julian period. This era was invented by a monk, Dionysius Exiguus, about 532. It was introduced into Italy in the 6th century, and ordered to be used by bishops by the Council of Chelsea in 816, but was not generally employed for several centuries. Charles III. of Germany was the first who added "in the year of our Lord" to his reign, in 879.

ANNONAY (an-o-nā), a town in southern France, department of Ardèche, 37 miles S. S. W. of Lyons, in a picturesque situation. It is the most important town of Ardèche, manufacturing paper and glove leather to a large extent, also cloth, felt, silk stuffs, gloves, hosiery, etc. There is an obelisk in memory of Joseph Montgolfier of balloon fame, a native of the town. Pop. about 17,500.

ANNUAL, in botany, a plant that springs from seed, grows up, produces seed, and then dies, all within a single year or season.

ANNUITY, a fixed sum of money paid yearly. In the United States the granting of annuities is conducted by private companies or corporations.

Under the Roman law annuities were sometimes granted by will, the obligation of paying them being imposed upon the heir. Borrowers in the Middle Ages were frequently obliged to grant annuities in lieu of interest, the exaction of which by creditors was forbidden as usury; and the practice received the papal sanction in the 15th century.

ANNULOIDA, in Huxley's classification, one of the eight primary groups into which he divides the animal kingdom. He places it between the annulosa and the infusoria. He includes under it (1) the *trematoda*, or flukes; (2) the *tæniada*, or tape-worms and bladder-worms; (3) the *turbellaria;* (4) the *acanthocephala;* (5) the *nematoidea*, or thread-worms; and (6) the *rotifera*, or wheel animalcules.

ANNULOSA, a sub-kingdom of the animal kingdom, corresponding to Cuvier's articulata. Annulosa, signifying ringed, is decidedly better, for the animals ranked under this sub-kingdom have their skeleton, which is external, composed of a series of rings. They are divided into *chaetognatha, annelida, crustacea, arachnida, myriapoda*, and *insecta.* The last four are further grouped together under the designation *arthropoda.*

ANNUNCIATION, the declaration of the angel Gabriel to the Virgin Mary informing her that she was to become the mother of our Lord. Annunciation or Lady Day is celebrated on the 25th of March. The Italian order of Knights of the Annunciation, now the highest Italian order, was instituted by Amadeus VI., Duke of Savoy, in 1360. The king is always Grand Master. The decoration of the Order consists of a golden shield suspended to a chain or collar of roses and knots, the letters F. E. R. T. being inscribed on the roses, and standing for *fortitudo ejus Rhodum tenuit* (its bravery held Rhodes). There are two orders of nuns of the Annunciation, French and Italian.

ANNUNZIO, GABRIELE D'. See D'ANNUNZIO, GABRIELE.

ANOA, a sub-genus of ruminating animals. The typical species is the *A. depressicornis*, a quadruped resembling a small buffalo, found gregarious in the mountains of the island of Celebes.

ANOBIUM, a genus of beetles belonging to the family Ptinidæ. It contains the well known death watch insects, *A. striatum, A. tesselatum*, etc.

ANODE, the name given by Faraday to what is called by Daniell the zincode, and by various other writers the positive pole of an electric battery; or, more precisely, the "way" or path by which the electric current passes out and enters the electrolyte on its way to the other pole. It is a platinum plate occupying the same place in the decomposing cell that a zinc plate does in an ordinary cell of a battery. The other plate corresponding to the second platinum one in an ordinary cell is called by Faraday the cathode or kathode, by Daniell the platinode, and by many other writers the negative pole. At the positive pole appears one element of the decomposed body, called anione, and at the negative the other element, termed katione.

ANODYNE, a medicine which alleviates pain, though, if given in too large doses, it induces stupor. Opium is so-

porific and anodyne; while belladonna is anodyne and anti-spasmodic.

ANOMALURE, a genus of rodent animals inhabitating the W. coast of Africa, resembling the flying-squirrels, but having the under surface of the tail "furnished for some distance from the roots with a series of large horny scales, which, when pressed against the trunk of a tree, may subserve the same purpose as those instruments with which a man climbs up a telegraph pole to set the wires."

ANOMURA, a sub-order of decapod crustaceans, intermediate between *macrura* and *brachyura*, differing from the former in the absence of an abdominal fan-shaped fin, as also of natatory feet; and from the latter in generally possessing appendages attached to the penultimate segment of their abdomen. The sub-order is divided into the families *paguridæ*, *hippidæ*, *raninidæ*, *homolidæ*, and *dromidæ*. Its best known representatives are the hermit crabs (*paguridæ*.

ANONA, a genus of plants, the type of the natural order *anonaceæ*. *A. squamosa* (sweet sop) grows in the West Indian islands, and yields an edible fruit having a thick, sweet, luscious pulp. *A. muricata* (sour sop) is cultivated in the West and East Indies; it produces a large pear-shaped fruit, of a greenish color, containing an agreeable, slightly acid pulp. The genus produces other edible fruits, as the common custard apple or bullock's heart, from *A. reticulata*, and the cherimoyer of Peru, *A. cherimolia*.

ANONACEÆ, an order of exogenous plants classed by Lindley under his ranales, or ranal alliance. They have six petals, hypogynous stamina generally indefinite in number, numerous ovaries, and a many carpeled, succulent, or dry fruit, and alternate simple leaves without stipules. They are trees or shrubs occurring in the tropics of both hemispheres. In 1846 Lindley estimated the known species at 300. Most have a powerful aromatic taste and smell, and the flowers of some are highly fragrant. Some have a succulent and eatable fruit.

ANOPLOTHERIUM, an extinct genus of the ungulata or hoofed quadrupeds, forming the type of a distinct family, which were in many respects intermediate between the swine and the true ruminants. These animals were pig-like in form, but possessed long tails, and had a cleft hoof, with two rudimentary toes.

ANOPLURA, an aberrant order of insects, sometimes termed, from their parasitic habits, parasitica or epizoa. They have six legs, no wings, and either two simple eyes or none. They are parasitic upon mammals and birds, and are generally termed lice. There are two sub-orders: (1) *Haustellata*, or *rhyncota*, having a mouth with a tubular, very short, fleshy haustellum, and (2) *mandibulata*, or *mallophaga*, in which the mouth is provided with two horny mandibles.

ANOSMIA, a disease consisting in a diminution or destruction of the sense of smell, sometimes constitutional, but most frequently caused by strong and repeated stimulants, as snuff, applied to the olfactory nerves.

ANSELL, SAMUEL TILDEN, an American soldier and lawyer, born in North Carolina in 1875. He studied at the Harvard Law School and at the Law School of the University of North Carolina. In 1895 he entered West Point, graduating in 1899. He saw service in the Philippines and assisted in the establishment of a civil government in the islands. In 1902 he became instructor of law and history at West Point, in which position he served first for two years and later for four years more. During his service at West Point he was assiduous in bringing about a liberalization of court-martial methods and these efforts continued throughout his military career. It was largely through his efforts that Congress enacted a more liberal military code. In 1912 he became senior assistant in the office of the Judge-Advocate-General. He drafted a large part of all legislation enacted which put the United States on a war footing at the beginning of the World War. In August, 1917, he became head of the office of the Judge-Advocate-General. In October of that year he was promoted to be a Brigadier-General. While he held this office he labored to establish a legal supervision of courts-martial.

During the World War he visited all the Allied armies of Europe in order to observe the administration of military justice. He exerted great influence toward the improvement of business methods of the War Department and the simplification of army organization. At the end of the war he was awarded the Distinguished Service Medal in recognition of his services as Acting Judge-Advocate of the Army. He resigned on July 21, 1919, and entered upon the practice of law.

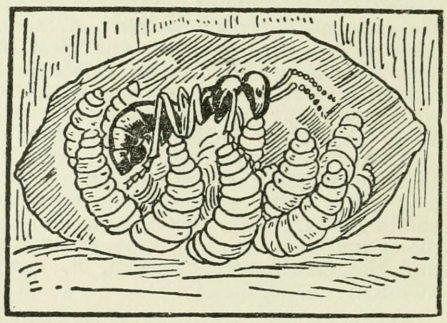
ANSELM OF CANTERBURY, ST., a scholastic philosopher, born at or near Aosta, in Piedmont, in 1033. In 1060 he entered the monastery of Bec in Normandy of which, in 1078, he became abbot. It was then the most famous monastic school. His friend Lanfranc, who had gone to England, and become Archbishop of Canterbury, died in 1089; and the diocese remained four years without a successor, till in 1093 Anselm was appointed. He was distinguished both as a churchman and a philosopher. His numerous embroilments with William Rufus and his successor, and the unbending spirit which he displayed in these, even when subjected to banishment, indicate the resoluteness of his character. Anselm was a second Augustine, superior to all his contemporaries in sagacity and dialectical skill, and equal to the most eminent in virtue and piety. He sought to reduce the truths of religion into the form of a connected series of reasonings. It was for this purpose he wrote his "Monologion." In his "Proslogion," he strove to demonstrate the existence of God. His "Cur Deus Homo" (English translation by Prout, 1887) argues the necessity of the Incarnation, all subsequent speculation on which it was profoundly influenced. Besides his philosophical treatise, his "Meditations and Letters" have come down to us, revealing his humble, fervent faith. His works first supplied the impulse to justify Scripture and the Church by reason. He died April 21, 1109, and was buried next to Lanfranc at Canterbury. In 1494 he was canonized.

ANSGAR, or **ANSHAR**, called the Apostle of the North, was born in 801 in Picardy, and took the monastic vows in boyhood. In the midst of many difficulties he labored as a missionary in Denmark and Sweden; dying in 864 or 865, with the reputation of having undertaken, if not the first, the most successful, attempts for the propagation of Christianity in the North.

ANSON, GEORGE, LORD, a celebrated English navigator, born in 1697; became a commander in 1722, and captain in 1724. In 1740 he was made commander of a fleet sent to the South Sea, directed against the trade and colonies of Spain. The expedition consisted of five men-of-war and three smaller vessels. After many stirring adventures he reached the coast of Peru, made several prizes, and captured and burned the city of Paita. His squadron was now reduced to one ship, the "Centurion," but with it he took the Spanish treasure galleon from Acapulco, and arrived in England in 1744, with treasure to the amount of £500,000, having circumnavigated the globe in three years and nine months. His adventures and discoveries are described in "Anson's Voyage." He was made rear-admiral of the blue, and not long after rear-admiral of the white. His victory over the French admiral, Jonquière, near Cape Finisterre in 1747, raised him to the peerage. He died in 1762.

ANSONIA, a city in New Haven co., Conn.; on the Naugatuck river and the New York, New Haven and Hartford railroad; 10 miles W. of New Haven. It is widely noted for its extensive manufactures of clocks, and brass, copper, and woolen goods; and has several banks, Young Men's Christian Association and memorial libraries, daily and weekly newspapers, etc. Pop. (1910) 15,152; (1920) 17,643.

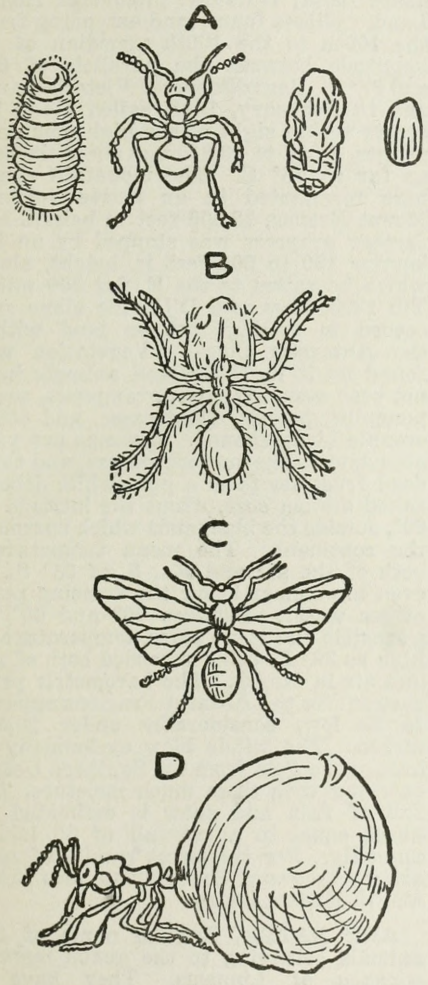
ANT, the common name of *hymenopterous* (membrane-winged) insects of various genera, of the family *Formicidæ*, found in most temperate and tropical regions. They are small but powerful insects, and have long been noted for



CELL OF BLACK NEST-FEEDING LARVÆ

their remarkable intelligence and interesting habits. They live in communities regulated by definite laws, each member of the society bearing a well-defined and separate part in the work of the colony. Each community consists of males; of females much larger than the males; and of barren females, otherwise called neuters, workers, or nurses. The neuters are wingless, and the males and females only acquire wings for their "nuptial flight," after which the males perish, and the few females which escape the pursuit of their numerous enemies divest themselves of their wings, and either return to established nests or become the foundresses of new colonies. The neuters perform all the labors of the ant-hill or abode of the community; they excavate the galleries, procure food, and feed the larvæ or young ants, which are

destitute of organs of motion. In fine weather they carefully convey them to the surface for the benefit of the sun's heat, and carry them to a place of safety either when bad weather is threatened or the ant hill is disturbed. In like manner they watch over the safety of



A. Larva, Black Ant, Pupae
B. Soldier of Black Ant
C. Queen of Black Ant
D. Honey Ant

the nymphs or pupæ about to acquire their perfect growth. Some communities possess a special type of neuters, known as "soldiers," from the duties that especially fall upon them, and from their powerful biting jaws. Most of American ants form nests in woods, fields, or gardens, their abodes being generally in the form of small mounds rising above the surface of the ground and containing numerous galleries and apartments. Some excavate nests in old tree trunks. Houses built by the common wood ant (*formica rufa*) are frequently as large as a small hay cock.

The senses of ants are well developed. They can perceive rays and hear sounds for which our sense organs are not adapted. They are able to recognize the members of their own community, even when these are intoxicated, or removed from the nest as larvæ and brought up separately. Their ingenuity in economizing labor, e. g., in dropping desired objects from a height to others waiting below—in overcoming obstacles, *e. g.*, by themselves forming living bridges or building more substantial inanimate ones—in the architectural devices exhibited by their manifold nests, and in many other ways—has become a common subject of deserved admiration though their marvelous powers are associated with no less striking limitations, in their recognition after separation for months, in their care for the young or disabled, as well as in their persistent enmity to competing species and communities, ants exhibit a considerable range of emotional development.

Some ants live on animal food, very quickly picking quite clean the skeleton of any dead animal they may light on. Others live on saccharine matter, being very fond of the sweet substance, called honey dew, which exudes from the bodies of aphides, or plant lice. These they sometimes keep in their nests, and sometimes tend on the plants where they feed; sometimes they even superintend their breeding. By stroking the aphides with their antennæ, they cause them to emit the sweet fluids, which the ants then greedily sip up. Various other insects are looked after by ants in a similar manner, or are found in their nests. It has been observed that some species, like the sanguinary ant (*formica sanguinea*), resort to violence to obtain working ants of other species for their own use, plundering the nests of suitable kinds of their larvæ and pupæ, which they carry off to their own nests to be carefully reared and kept as slaves. In temperate countries male and female ants survive, at most till autumn, or to the commencement of cool weather, though a very large proportion of them cease to exist long previous to that time. The neuters pass the winter in a state of torpor, and of course require no food. The only time they require food is during the season of activity, when they have a vast number of young to feed. Some ants of southern Europe feed on

grain, and store it up in their nests for use when required. Some species have stings as weapons, others only their powerful mandibles, or an acrid and pungent fluid (formic acid) which they can emit. The name ant is also given to the neuropterous insects otherwise called termites.

ANTACID, an alkali, or any remedy for acidity in the stomach. The principal antacids in use are magnesia, lime, and their carbonates, and the carbonates of potash and soda.

ANTÆUS (an-tē'us), the giant son of Poseidon (Neptune), and Gē (the earth), who was invincible so long as he was in contact with the earth. Heracles (Hercules) grasped him in his arms and stifled him suspended in the air.

ANTALKALI, a substance which neutralizes an alkali, and is used medicinally to counteract an alkaline tendency in the system. All true acids have this power.

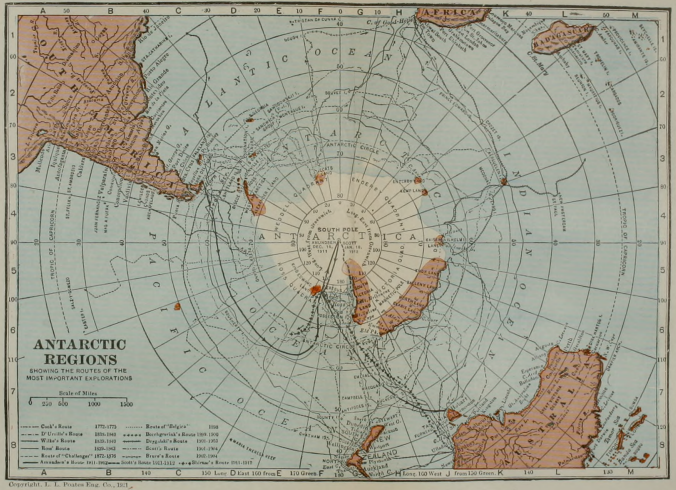
ANTANANARIVO, the capital of Madagascar, situated in the central province of Imérina. It has manufactures of metal work, cutlery, silk, etc., and exports sugar, soap, and oil. Pop. about 100,000. (See MADAGASCAR.)

ANTARCTICA, one of the names given to the region around the South Pole.

ANTARCTIC EXPLORATIONS. See ARCTIC AND ANTARCTIC EXPLORATIONS.

ANTARCTIC OCEAN, the ocean situated about, or within, the Antarctic Circle. The great Southern Ocean is that part of the ocean which surrounds the world in one continuous band between the latitude of 40° S. and the Antarctic Circle. This band is only partially interrupted by the southern prolongation of South America. The northern portions of this band are often called the South Atlantic, South Indian, and South Pacific, while the southern portions are usually called the Antarctic Ocean. The average depth of the continuous ocean surrounding the South Polar Land is about 2 miles; it gradually shoals toward Antarctic Land, which in some places is met with a short distance within the Antarctic Circle. The "Challenger" found 1,800 fathoms near the Antarctic Circle S. of Kerguelen, but Ross records a much greater depth in the same latitude S. of the Sandwich group. Only three navigators, Cook, Weddell, and Ross, have crossed the 70th parallel S. Of several other expeditions that have crossed the Antarctic Circle the most notable was the "Challenger," in 1874, the only steam vessel that had visited these seas. The majority of Antarctic voyagers have discovered land S. of the 60th parallel, Cook in 71° S. and 107° W. Bellingshausen discovered Peter Island and Alexander Land; D'Urville discovered Adelie Land. Wilkes found land extending from the 100th to the 160th meridian of E. longitude between the parallels of 65° and 67° S. Ross discovered Victoria Land, and in February, 1841, sailed along its coasts within sight of the high mountain ranges, 7,000 to 10,000 feet above the sea, as far as 78° S. The mountain range here terminated in an active volcano, Mount Erebus, 12,000 feet in height. His farther progress was stopped by an icy barrier 150 to 200 feet in height, along which he sailed to the E. for 300 miles. Till 1895, Ross and D'Urville alone succeeded in setting foot on land within the Antarctic Circle. Vegetation was found on it in 1895; land animals have not been seen. Whales, grampuses, seals, penguins, petrels, albatrosses, and other oceanic birds abound. Diatoms are very abundant in the surface-waters, and their dead frustules form a pure white deposit called diatom ooze, about the latitude of 60°, outside the blue muds which surround the continent. The mean temperature both of the air and sea, S. of 63° S., is even in summer below the freezing point of sea water. Between 60° and 63° S., a sensible rise takes place, temperature as high as 38° F. being recorded both of sea and air in March. The barometric pressure within the Antarctic regions appears to be low, considerably under 29.000 inches. The winds blow cyclonically in toward the Pole from the Southern Ocean, carrying with them much moisture. The fall of rain and snow is estimated as about equal to a rainfall of 30 inches annually. For the latest results of Antarctic discovery See ARCTIC AND ANTARCTIC EXPLORATIONS.

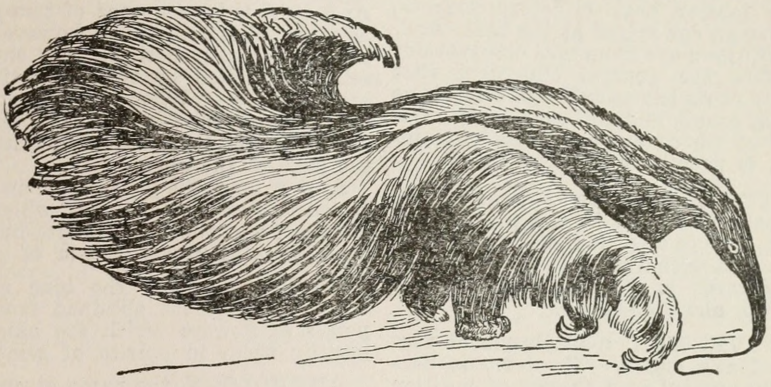
ANT EATER, English name of the animals belonging to the genus *myrmecophaga* of Linnæus. They have a lengthened muzzle terminated by a small, toothless mouth, from which they protrude a long, threadlike tongue, covered with viscous saliva. This they thrust into the nets of termites, or those of ants proper, sucking the animals which adhere to it into their mouths. Their claws are strong, and are used for tearing to pieces the structures erected by the termites. Among the species may be enumerated the *M. jabata*, the great or maned ant eater, which has four toes before and five behind, and the *M. didactyla*, the



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little or two-toed ant eater. Both are South American.

The scaly ant eaters are of an allied genus, manis. They derive their English name from the fact that they are covered with thick scales, which give them the



ANT EATER

superficial appearance of reptiles. The short-tailed manis, *M. pentadactyla* of Linnæus, is found in Bengal and the Indian archipelago, and *M. tetradactyla* in Africa. The proper and scaly ant eaters *edentata*, or toothless animals. To the same order belong the Cape ant eaters, *orycteropus capensis*.



SABLE ANTELOPE

ANTEDILUVIAN, before the flood or deluge of Noah's time; relating to what happened before the deluge. In geology the term has been applied to organisms, traces of which are found in a fossil state in formations preceding the diluvial, particularly to extinct animals such as the paleotherium, the mastodon, etc.

ANTELOPE, the name given to the members of a large family of ruminant *ungulata* or hoofed *mammalia*, closely resembling the deer in general appearance, but essentially different in nature from the latter animals. They are included with the sheep and oxen in the family of the cavicornia or "hollow-horned" ruminants. Their horns, unlike those of the deer, are not deciduous, but are permanent; are never branched, but are often twisted spirally, and may be borne by both sexes. They are found in greatest number and variety in Africa. Well known species are the chamois (European), the gazelle, the addax, the eland, the koodoo, the gnu, the springbok, the sasin or Indian antelope, and the prongbuck of America.



ADDAX ANTELOPE

ANTENNÆ, the name given to the movable jointed organs of touch and hearing attached to the heads of insects, myriapods, etc., and commonly called horns or feelers. They present a very great variety of forms. The small antennæ of the lobster bear olfactory bristles, and have an ear lodged at the base. And, in short, there are numerous observations to justify the general statement that in many cases the antennæ are sensitive to smell, sound, and probably taste. Deprived of its antennæ, an ant, for instance, is peculiarly helpless.

ANTEQUERA (an-te-kā'ra), a city of Andalusia in Spain, in the province of Malaga, a place of some importance under the Romans, with a ruined Moorish castle. Manufactures of woolen, leather, soap, etc. Pop. about 35,000.

ANTEVERSION, a displacement forward of any organ. The term is particularly applied to a change of position of the uterus, in which the organ is bodily displaced in the pelvic cavity, so that the fundus is directed against the bladder, and the cervix toward the sacrum.

ANTHELION, a luminous ring, or rings, seen by an observer, especially in Alpine and polar regions, around the shadow of his head projected on a cloud or fog bank, or on grass covered with dew, 50 or 60 yards distant, and opposite the sun when rising or setting. It is due to the refraction of light.

ANTHEM, originally a hymn sung in alternate parts, in modern use, a sacred tune or piece of music set to words taken from the Psalms or other parts of the Scriptures, first introduced into church service in Elizabeth's reign; a developed motet. The anthem may be for one, two or any number of voices, but seldom exceeds five parts, and may or may not have an organ accompaniment written for it.

ANTHEMIS, a genus of plants belonging to the order *asteraceæ*, or composites. It contains the Roman chamomile (*A. nobilis*). The flower buds constitute the chamomile of the shops. Cattle eat it with avidity. As a medicine it is tonic and stimulating. The true chamomile plant has a fine smell, in this differing from the *anthemis cotula*, or stinking chamomile.

ANTHEMIUS (an-them'ē-us), a Roman emperor of the West (467-472); son of Procopius and son-in-law of Marcian, Emperor of the East. He was nominated emperor by Leo, the Emperor of the East, and became the father-in-law of Ricimer. Subsequently Ricimer became his enemy, and, in a war between them, Anthemius was killed.

ANTHER, an organized body constituting part of a stamen and generally attached to the apex of the filament. As a rule, it is composed of two parallel lobes or cells; sometimes, however, there are four, and sometimes only one. The cells are united by the connective, and contain pollen. When the time for shedding it arrives, the anthers burst generally by a longitudinal fissure from the base to the apex.

Anther dust, the pollen from an anther. It constitutes a yellow dust, which, when it falls from the atmosphere, has often been mistaken for a shower of sulphur.

ANTHOCYANIN, the blue color of flowers, a pigment obtained from those petals of flowers which are blue by digesting them in spirits of wine.

ANTHOLOGY, the name given to several collections of short poems which have come down from antiquity. The first who compiled a Greek anthology was Meleager, a Syrian, about 60 B. C. He entitled his collection, which contained selections from 46 poets besides many pieces of his own, the "Garland"; a continuation of this work by Philip of Thessalonica in the age of Tiberius was the first entitled "Anthology." There is no ancient Latin anthology, the oldest being that of Scaliger (1573).

ANTHON, CHARLES, an American classical scholar, born in New York City, Nov. 19, 1797. He was for many years Professor of Ancient Languages at Columbia College. A beautiful edition of Horace first made him famous among scholars. His best known work was an edition of Lemprière's "Classical Dictionary" (1841). He was also the editor of over 50 classical text-books. He died July 29, 1867.

ANTHONY, ST., the founder of monastic institutions, born near Heraclea, in Upper Egypt, A. D. 251. Giving up all his property, he retired to the desert, where he was followed by a number of disciples, who thus formed the first community of monks. He died at the age of 105. As a saint of the Roman Catholic Church he is much esteemed.

ANTHONY, ST., FALLS OF, a noted fall in the Mississippi river, now within the city limits of Minneapolis, Minn. The perpendicular fall is 17 feet, with a rapid below of 58 feet. An island divides the river into two parts. The entire descent of the stream for three-quarters of a mile is 65 feet. The falls

and surrounding scenery, especially during the spring floods, are exceedingly picturesque.

ANTHONY, SUSAN BROWNELL, an American reformer, born in South Adams, Mass., Feb. 15, 1820, of Quaker parentage, taught school in New York in 1835-1850. In 1847 she first spoke in public, taking part in the temperance movement and organizing societies. In 1852 she assisted in organizing the Woman's New York State Temperance Society; in 1854-1855 she held conventions, in each county in New York, in behalf of female suffrage. In 1857 she became a leader in the anti-slavery movement, and in 1858 advocated the coeducation of the sexes. She was influential in securing the passage by the New York Legislature, in 1860, of the act giving married women the possession of their earnings, and guardianship of their children. In 1868, with Mrs. E. C. Stanton and Parker Pillsbury, she began the publication of the "Revolution," a paper devoted to the emancipation of woman. Her last public appearance of note was as a delegate to the International Council of Women, in London, England, in 1899. In 1900 her birthday was celebrated by an affecting popular demonstration in Washington, D. C. She died March 13, 1906.

ANTHRACENE, a substance obtained in the distillation of coal-tar. Although long known to chemists, it is as the source of artificial alizarin that it has become of commercial value. Anthracene gives rise to a large number of compounds, formed by replacing part of the hydrogen which it contains with chlorine, alcohol radicals, etc., and accordingly named chloranthracene, methylanthracene, and so on.

ANTHRACITE, glance, or blind coal, a non-bituminous coal of a shining luster, approaching to metallic, and which burns without smoke, with a weak or no flame, and with intense heat. It consists of, on an average, 90 per cent. carbon, 3 hydrogen and 5 ashes. It has some of the properties of coke or charcoal. It is found in England, Scotland, and Ireland, and in large quantities in the United States, chiefly in Pennsylvania. See COAL.

ANTHRAX (Greek, a carbuncle), the name now generally used of a widely distributed and very destructive disease, most common among sheep and cattle. Besides its practical importance, it has special theoretical interest, because it was the first infectious disease proved to be due to the presence of microscopic vegetable organisms. Cattle and sheep are most commonly attacked by anthrax. In the most acute (apoplectiform) cases, the animal falls as if he had received a severe blow and goes into convulsions, and death follows in a few minutes or hours. Anthrax does not readily attack man. It occurs in those whose occupations bring them into contact with diseased animals or their hides, wool, etc.

ANTHROPOID, resembling man; a term applied especially to the apes, which approach the human species in the following order: 1st (most remote), the gibbons; 2d, the orangs; 3d, the chimpanzee; and, 4th (nearest), the gorilla.

ANTHROPOLOGY, the science of man in the widest sense of the term. The word anthropology has been variously defined as "The doctrine of anatomy; the doctrine of the form and structure of the body of man."

The word is also applied to the science which investigates the relation in which man stands to the inferior animals. In this sense ethnology is a cognate science to anthropology.

ANTHROPOMETRY, the measurement of the human body to discover its exact dimensions and the proportions of its parts for comparison with its dimensions at different periods, or in different races or classes. Cranial measurements have long been adopted by anthropologists as the basis of their classifications of races; but the conformation of the skull and the relation of its height to its breadth vary so much within the same tribe as not to be, of themselves, sufficient data on which to rest generalizations.

The French anthropologists depend much more on anthropometry than the English, and have adopted a form of schedule containing as many as 102 different observations of a single individual. The anthropometric committee of the English Anthropological Society distributed the average stature of British adult males into racial elements as follows: Early British, 66.6 inches; Saxon, 67.2; Scandinavian, 68.3; Anglian, 68.7. Similar detailed anthropometric measurements will be seen in the special anthropological journals, French, English, and German, and in the more scientific of recent books of travel. The French police systematically employ anthropometric methods for the indentification of criminals, carefully recording for future use the various measurements. See BERTILLON SYSTEM.

ANTHROPOMORPHISM, the attributing of a human form to God. When this is really done it is a gross degra-

dation of the Divinity and is condemned in Scripture. But when the only anthropomorphism is the use of metaphorical phrases, such as the arm of the Lord (Ps. lxxvii: 15), or His eyes (Ps. xi: 4), of His ears (Ps. xxxiv: 15), to make abstract ideas more readily conceivable, the practice has the countenance of Scripture itself.

ANTI-CHRIST, anyone who denies the Father and the Son; or who will not confess that Jesus Christ is come in the flesh, or who, leaving the Church, pretends to be the Christ (or Messiah), and thus becomes a rival and enemy of Jesus, the true Christ.

In a special sense one who should preeminently stand forth as the antagonist of Christ, and should be a sufficiently prominent personage to become the theme of prophecy; or if *anti* be held to mean instead of, then the characteristic of Antichrist will be a supercession of Christ, not an avowed antagonism to Him.

ANTICLINAL LINE or **AXIS**, in geology, the ridge of a wavelike curve made by a series of superimposed strata, the strata dipping from it on either side as from the ridge of a house: a synclinal line runs along the trough of such a wave.

ANTICOSTI, an island in the Gulf of St. Lawrence, which it divides into two channels, with lighthouses at different parts of the coast, and about 140 miles long, and 30 miles broad in the center. Area, 3,147 square miles. Anticosti has two harbors, Ellice bay, near the W. end, and Fox bay in the N. W. The climate is severe; while the surface is an alternation of rocks and swamps. It is visited by fishermen in the summer, but there are hardly any inhabitants save lighthouse keepers and a few officials. The island, which is attached to the Canadian province of Quebec, has considerable salmon, trout, cod, and herring fisheries, and is a resort for seal and bear hunting. Extensive peat deposits are found in Anticosti. Marl also occurs. M. Henri Menier, a French manufacturer, purchased the island in 1895 as a game preserve. Pop. about 250.

ANTIETAM, a small river in Pennsylvania and Maryland which empties into the Potomac six miles N. of Harper's Ferry. On Sept. 16 and 17, 1862, a battle was fought on its banks near Sharpsburg, between the Federal army of about 80,000 men, under General McClellan, and a Confederate army variously reported at from 40,000 to 97,000 men, under General Lee. The Federal casualties aggregated 12,469, and the Confederate about 11,000. General Lee recrossed the Potomac on the following day, and the general consensus is that the battle was tactically indecisive.

ANTIFEBRIN, acetanilid (C_8H_9NO), an aniline derived from acetate of aniline at an elevated temperature by a dialytic action in which water is set free. It has been employed with excellent results as a pain-reliever in neuralgic and rheumatic affections, as a sedative febrifuge and antipyretic.

ANTI-FEDERALISTS, members of a political party, in the United States, which opposed the adoption and ratification of the constitution, and failing in this, strongly favored the strict construction of it. The strengthening of the National Government at the expense of the States was also opposed. Soon after the close of Washington's first administration (1793) the name of Anti-Federal went out of use, the term Republican, and afterward Democratic-Republican and Non-Democratic, alone taking its place.

ANTIFRICTION METAL, a name given to various alloys of tin, zinc, copper, antimony, lead, etc., which oppose little resistance to motion, with great resistance to the effects of friction, so far as concerns the wearing away of the surfaces of contact. Babbitt's metal (50 parts tin, 5 antimony, 1 copper) is one of them.

ANTIGO, a city of Wisconsin, in Langlade co. It is on the Chicago and Northwestern railroad and on Spring Brook river. It is the center of an important agricultural and lumbering region and has important industries, including the manufacture of wooden ware, flour mills, sawmills, wagon works, etc. It has a teachers' training school, a school for the blind, and a Carnegie library. Pop. (1910) 7,196; (1920) 8,451.

ANTIGONE (an-tig'o-nē), in Greek mythology, the daughter of Œdipus and Jocasta, celebrated for her devotion to her father and to her brother Polynices, for burying whom against the decree of King Creon she suffered death. She is heroine of Sophocles' "Œdipus at Colonus" and his "Antigone"; also of Racine's tragedy, "The Hostile Brothers."

ANTIGONUS (an-tig'ō-nus), one of the generals of Alexander the Great, born about 382 B. C. After the death of Alexander, Antigonus obtained Greater Phrygia, Lycia, and Pamphylia as his dominion. Ptolemy, Cassander, and Lysimachus, alarmed by his ambition, united

themselves against him; and a long series of contests ensued in Syria, Phœnicia, Asia Minor, and Greece, ending in 301 B. C. with the battle of Ipsus in Phrygia, in which Antigonus was defeated and slain.

ANTIGUA (an-tē'ga), one of the British West Indies, the most important of the Leeward group; 28 miles long, 20 broad; area, 108 square miles; discovered by Columbus, 1493. Its shores are high and rocky; the surface is varied and fertile. The capital, St. John (pop. about 10,000), is the residence of the governor of the Leeward Islands. The staple articles of export are sugar, molasses, rum. Pop., including Barbuda and Redonda, about 40,000.

ANTILLES (an-til'lez), another name for the West Indian islands, not including the Bahamas. Subdivided into Greater Antilles and Lesser Antilles.

ANTILOCHUS, in Greek legend, the son of Nestor, who fell at the siege of Troy by the hand of Memnon.

ANTIMACHUS (an-tim'a-kus), a Greek epic and elegiac poet; flourished about 400 B. C. His chief works were the epic "Thebaïs," and an elegy on his dead love Lyde.

ANTI-MASONIC PARTY, a political organization in opposition to Freemasonry. In 1826 William Morgan, a Freemason, living in Batavia, N. Y., was suspected of being in league with other Masons in preparing a revelation of Masonic secrets. The report that Morgan, who had disappeared suddenly, had been abducted and drowned, caused much excitement, which finally gave rise to a political party. By 1832 the party had spread to other States and William Wirt was nominated for President, and Amos Ellmaker for Vice-President. This ticket was carried in Vermont only. In 1832 the party nearly elected Joseph Ritner Governor of Pennsylvania, and, in 1835, through a split in the Democratic Party, did elect him. From then on it disappeared as suddenly as it had come into existence.

ANTI-MILITARISM. See MILITARISM.

ANTIMONY, in chemistry, a triad metallic element, but in some less staple compounds it appears to be pentad. Symbol, Sb.; atomic weight, 122; sp. gr., 6.8; melting point, 450°. It can be distilled, but takes fire when strongly heated in the air, forming Sb_2O_3. Antimony is a bright bluish-white, brittle, easily pulverized metal, which occurs in Sb_2S_3, and as cervanite, Sb_2O_4; also as valentinite and senarmonite, Sb_2O_3. The metal is obtained by heating the sulphide with half its weight of metallic iron, or with potassium carbonate. It is oxidized by nitric acid, forming Sb_2O_5. Type metal is an alloy of lead with 20 per cent. of antimony. Finely powdered antimony takes fire when thrown into chlorine gas. Salts of antimony are used in medicine, in large doses they are poisonous. Antimony is detected by the properties of its sulphide, chloride, and of SbH_3. It is precipitated by metallic zinc and iron from its solutions as a black powder.

In mineralogy, antimony occurs native, occasionally alloyed with a minute portion of silver, iron, or arsenic. It is very brittle. It occurs in Sweden, Germany, Austria, France, Borneo, Chile, Mexico, Canada, and New Brunswick.

In pharmacy, black antimony consists of native sulphide of antimony fused and afterward powdered. It is not itself used as a drug, but is employed in preparing tartar emetic, sulphurated antimony, and terchloride of antimony. It is given to horses as an alterative powder; two parts of sulphur, one of saltpeter, and one of black antimony. It is used in the preparation of Bengal signal lights; six parts of saltpeter, two of sulphur, and one of black antimony. Chloride of antimony ($SbCl_3$) is a solution used as a caustic and escharotic; it is never given internally. Sulphurated antimony consists of a sulphide of antimony with a small admixture of oxide of antimony. It enters into the composition of compound calomel pills.

ANTINOMIANISM (Greek, *anti*, "against," and *nomos*, "law"), the doctrine or opinion that Christians are freed from obligation to keep the law of God. It is generally regarded, by advocates of the doctrine of justification by faith, as a monstrous abuse and perversion of that doctrine, upon which it usually professes to be based. The term was first used at the time of the Reformation, when it was applied by Luther to the opinions advocated by Johann Agricola. Agricola had adopted the principles of the Reformation; but in 1527 he found fault with Melanchthon for recommending the use of the law, and particularly of the ten commandments, in order to produce conviction and repentance, which he deemed inconsistent with the Gospel. Ten years after, he maintained in a disputation at Wittenberg that, as men are justified simply by the Gospel, the law is in no way necessary for justification or for sanctification. The Antinomian controversy of this time, in which Luther took a very active part, terminated in 1540,

in a retractation by Agricola; but views more extreme than his were afterward advocated by some of the English sectaries of the period of the Commonwealth; and without being formally professed by a distinct sect, antinomianism has been from time to time reproduced with various modifications. It ought, however, to be borne in mind that the term has no reference to the conduct, but only to the opinions, of men; so that men who practically disregard and violate the known law of God are not, therefore, antinomians; and it is certain enough that men really holding opinions more or less antinomian have in many cases been men of moral life. Antinomianism usually originates in mistaken notions of Christian liberty, or in confusion of views as to the relation between the moral law and the Jewish law of ceremonial ordinances.

ANTINOMY, the opposition of one law or rule to another law or rule; in the Kantian philosophy, that natural contradiction which results from the law of reason, when passing the limits of experience, we seek to conceive the complex of external phenomena, or nature, as a world or cosmos.

ANTINOUS (an-tin'ō-us), a young Bithynian whom the extravagant love of Hadrian has immortalized. He drowned himself in the Nile in 122 A. D. Hadrian set no bounds to his grief for his loss. He gave his name to a newly-discovered star, erected temples in his honor, called a city after him, and caused him to be adored as a god throughout the empire. Statues, busts, etc., of him are numerous.

ANTIOCH (an'ti-ok), a famous city of ancient times, the capital of the Greek kings of Syria, on the left bank of the Orontes, about 21 miles from the sea, in a beautiful and fertile plain; founded by Seleucus Nicator in 300 B. C., and named after his father, Antiochus. In Roman times it was the seat of the Syrian governors, and the center of a widely extended commerce. In the first half of the 7th century it was taken by the Saracens, and in 1098 by the Crusaders. They established the principality of Antioch, of which the first ruler was Bohemond, and which lasted till 1268, when it was taken by the Mameluke Sultan of Egypt. In 1516 it passed into the hands of the Turks. The modern Antioch, or Antakieh, occupies but a small portion of the site of the ancient Antioch. Pop. about 30,000. There was another Antioch, in Pisidia, at which Paul preached on his first missionary journey.

ANTIOCH COLLEGE, a coeducational (non-sectarian) institution in Yellow Springs, O., organized in 1852; reported in 1919: Professors, 17; students, 165; president, G. D. Black.

ANTIOCHUS (an-ti'o-kus), a name of several Græco-Syrian kings of the dynasty of the Seleucidæ.

ANTIOCHUS I., called Soter (savior), was a son of Seleucus, general of Alexander the Great, and founder of the dynasty. He was born about B. C. 324, and succeeded his father in B. C. 280. During the greater part of his reign he was engaged in a protracted struggle with the Gauls, who had crossed from Europe, and by whom he was killed in battle B. C. 261.

ANTIOCHUS II., surnamed Theos (god), succeeded his father, lost several provinces by revolt, and was murdered in B. C. 246 by Laodice, his wife, whom he had put away to marry Berenice, daughter of Ptolemy.

ANTIOCHUS III., surnamed the Great, grandson of the preceding, was born B. C. 242, succeeded in B. C. 223. The early part of his reign embraced a series of wars, his expeditions extending to India, over Asia Minor, and into Europe, where he took possession of the Thracian Chersonese. Here he encountered the Romans, who had conquered Philip V. of Macedon. Antiochus gained an important adviser in Hannibal, who had fled for refuge to his court. The Romans defeated him by sea and land, and he was finally overthrown by Scipio at Mount Sipylus, in Asia Minor, B. C. 190. He was killed while plundering a temple in Elymais.

ANTIOCHUS IV., called Epiphanes, youngest son of the above, is chiefly remarkable for his attempt to extirpate the Jewish religion, and to establish in its place the polytheism of the Greeks. This led to the insurrection of the Maccabees, by which the Jews ultimately recovered their independence. He died B. C. 164.

ANTIOQUIA (an-tē-ō-kē'a), a department of Colombia, South America. It has considerable mineral wealth. Area, 22,752 square miles. Pop. about 750,000. Capital, Medellin (pop. about 50,000).

ANTIPÆDOBAPIST, one who is opposed to the doctrine of infant baptism.

ANTIPAROS (an-tip'ar-os), one of the Cyclades (islands), in the Grecian Archipelago, containing a famous stalactitic grotto or cave. It lies S. W. of Paros, from which it is separated by a

narrow strait, and has an area of 10 square miles, and about 500 inhabitants. Its grotto is not alluded to by any Greek or Roman writer, but has been well known since 1673. At a depth of 918 feet under the entrance the chief chamber is reached. It is 31 feet long, 98 wide, and 82 high, and is covered everywhere with the most wonderful stalactite and stalagmite formations.

ANTIPATER (an-tip'a-ter), a general and friend of Philip of Macedon, father of Alexander the Great. On the death of Alexander, in 323 B. C., the regency of Macedonia was assigned to Antipater, who succeeded in establishing the Macedonian rule in Greece on a firm footing. He died in B. C. 317, at an advanced age.

ANTIPATER, procurator of Judea for the Romans from 47 to 43 B. C. He received the appointment from Julius Cæsar; and died from poison in the last mentioned year. He was the father of Herod the Great.

ANTIPATHY, a special dislike exhibited by individuals to particular objects or persons, usually resulting from physical or nervous organization. An antipathy is often an unaccountable repugnance to what people in general regard with no particular dislike, as certain sounds, smells, articles of food, etc.

ANTIPHLOGISTIC (an-te-flo-jis'tik), a term applied to medicines or methods of treatment that are intended to counteract inflammation.

ANTIPHONY, opposition or contrariety of sound; also the alternate chanting or singing in a cathedral, or similar service by the choir, divided into two parts for the purpose, and usually sitting upon opposite sides. It is sometimes used also when the parts are repeated instead of sung. Antiphony differs from symphony, for in the latter case the whole choir sing the same part. It also differs from responsorium, in which the verse is spoken or sung by only one person instead of many.

ANTIPODES (an-tip'o-dēz), the name given relatively to the people or places on opposite sides of the earth.

ANTIPODES ISLANDS, a group of small uninhabited islands in the South Pacific Ocean, about 460 miles S. E. of New Zealand; so called from being nearly antipodal to Greenwich, England.

ANTIPOPE, a pontiff elected in opposition to one canonically chosen. The first antipopes were Felix, during the pontificate of Liberius (352-366); Ursinus, against Damascus (366-384); and Laurentius, against Symmachus (498-514). During the Middle Ages several emperors of Germany set up popes against those whom the Romans had elected without consulting them. Otho the Great displaced successively two Bishops of Rome; and when the rival Pope, Sylvester III., had expelled the simoniacal and profligate Benedict IX. (1033-1045), the latter was brought back by the German King, and soon afterward sold his dignity to Gregory VI. There were now, consequently, three popes, but their claims were all set aside at a council convened at Sutri by the Emperor, Henry III., and a new Pope elected as Clement II. in 1046. Shortly after, Pope Alexander II. found a rival in Honorius II., the nominee of the Emperor; but his claim was ratified at a council convened at Mantua. In 1080 the same unseemly spectacle was witnessed, when the Emperor, Henry IV., elevated to the papal chair Guibert of Ravenna, under the title of Clement III., in opposition to his own implacable adversary, Gregory VII. But after the death of Gregory (1085), Clement was himself opposed successively by Victor III. (1086-1088) and Urban II. (1088-1099). Innocent II. (1130-1143) triumphed over the Antipope Anacletus II. by the help of St. Bernard; and Alexander III., during his pontificate (1159-1181), had to contend with no fewer than four successive antipopes, the election of only one of whom, however, Victor V., in 1159, has any canonical validity. After only one of whom, however, Victor V., in 1305, and four years later he transferred his seat to Avignon, where his successors reigned for nearly 70 years, losing the while, by their subjection to French influences, the sympathies of Germany and England. The election of Urban VI. in 1378 occasioned "the great schism of the West," which divided the Church for 50 years. He was elected by the Romans, who demanded an Italian Pope after the death of Gregory XI. The French cardinals, then a majority in the curia, on the plea that they had elected the Pope only under intimidation, withdrew to Provence, and elected a new Pope under the name of Clement VII., who was recognized by France, Spain, Savoy, and Scotland; while Italy, Germany, England, and the whole North of Europe, supported Urban VI. For 38 years Christian Europe was scandalized by the spectacle of two Popes, one at Geneva, another at Rome, in turn hurling the most awful anathemas of the Church at each other, like "two dogs snarling over a bone," in Wyclif's phrase. At the beginning of the 15th century, an attempt was made to prevail on both the rivals,

Gregory XII. at Rome, and Benedict XIII. at Avignon, to renounce their claims with a view to promote union, but both evaded this as long as possible. At length, however, the cardinals attached to either court agreed to summon a general council, which met accordingly at Pisa in 1409. The council deposed both Popes, and constituted the separate bodies of cardinals into one conclave which elected Alexander V. to the papal chair. The Council of Basel (1431-1447), in its struggle with Pope Eugenius IV. (1431-1447) for supremacy, attempted to arrogate to itself the papal functions, and proceeded to elect Amadeus of Savoy Pope, as Felix V. The attempt, however, failed; the Popes Eugenius IV. and Nicholas V. (1447-1455), secured their authority, the ambitious council finally dissolved itself, and Felix V. resigned his empty dignity, and was raised to the rank of cardinal by the magnanimous Pope himself. This was the last occasion on which the faithful were distracted by the sight of a rival pontiff within Christendom.

ANTIPYRETICS, medicines which reduce the temperature in fever.

ANTIPYRINE, an alkaloid extensively used in medicine as an antipyretic, and possessing the valuable property of materially reducing the temperature of the body without the production of any distressing bodily symptoms.

ANTIQUES, a term specifically applied to the remains of ancient art, as statues, paintings, vases, cameos, and the like, and more especially to the works of Grecian and Roman antiquity.

ANTI-RENT PARTY, a party which gained some political influence in New York, and which had its origin in the refusal of tenants, who were dissatisfied with the patroon system in vogue in 1839, to pay rent. The matter was settled by compromise in 1850.

ANTIRRHINUM (an-ti-rī'num), a genus of annual or perennial plants of the natural order *scrophulariaceæ*, commonly known as snapdragon, on account of the peculiarity of the blossoms, which, by pressing between the finger and thumb, may be made to open and shut like a mouth. They all produce showy flowers, and are much cultivated in gardens. Many varieties of some of them, such as the great or common snapdragon (*A. majus*), have been produced by gardeners.

ANTI-SALOON LEAGUE, an organization whose activities were undoubtedly the chief factor in the promotion of nation-wide prohibition under a Constitutional Amendment and the Volstead act which went into effect Jan. 16, 1920. The first step was the formation of the Anti-Saloon League of Ohio, chiefly through the labors of Dr. Howard H. Russell at Oberlin, in 1893. The basic idea was that the work so far had all been done under moral and religious auspices—by the churches, the W. C. T. U., and like organizations; that the results in the Prohibition party were of slow growth, and that a live organization was needed to influence political thought and action directly.

The prime aim of the League was to take the prohibition movement immediately into the sphere of politics. Up to that time the work had been chiefly educational, and results were slow in coming. The League frankly declared the liquor traffic to be a political issue—and started out from the beginning to attack it in that way. The only way to get prohibition was by laws—the only way to get the laws was to directly influence public opinion to elect the men who would make them. The liquor interests had for years been doing this. The Anti-Saloon League was formed to fight the enemy with its own weapons. To bring the issue squarely before the people—not so much as a moral and religious issue as an economic and political one—was the work it set itself to do. In Ohio it went at once to the churches and asked the privilege through its speakers and printed matter, and general propaganda, of taking up the temperance work. It became in this way a kind of clearing-house for all the religious bodies who were interested. In return for their financial support it undertook to do the work for one and all of them, as a kind of collective executive of the most militant type. It began by a general canvass of all sections to tabulate carefully the entire vote of Ohio for or against prohibition. When a district with a preponderance of prohibition sentiment was found, it then went to work to find the best possible candidate for as many offices as possible from the Senate down who was committed to its side. By active propaganda such men were elected, until a final majority in both houses triumphantly carried through the Eighteenth Amendment.

A brother organization was formed at Washington governmental headquarters in the same year. Thus the very citadel of politics was attacked from the start. Two years later the work was so well founded that the Washington League issued a call for a general Anti-Saloon League movement throughout the nation.

Five States responded at once and the American Anti-Saloon League was organized at Washington the following December 18, the Ohio and Washington Leagues being the other constituents. Dr. Howard H. Russell was chosen national superintendent, and a weekly organ, the "American Issue," was established.

With this as a starting point, the cause spread rapidly and State after State came in. The work began always with effort for local option, the motto of the League being "let's go a step at a time." It worked often in co-operation with other organizations—but always in the lead. It was frankly taken by the great Protestant religious bodies, and even by high dignitaries of the Roman Church, like Archbishop Ireland and Bishop Spaulding, as meaning business from the start. It was thus recognized at once as THE factor of the prohibition movement in politics—a result-getter—and its strength increased daily. It began with local option fights, gradually winning its local battles, till it was enabled to launch a state-wide campaign. To the original "dry" column—Maine 1851, Kansas 1880, North Dakota 1889, it added Oklahoma 1907, Georgia 1908, North Carolina, Mississippi, and Tennessee 1909, and fifteen other States up to the introduction of the Volstead act in 1918. It is not too much to say that the liberally financed, ably managed, and tireless campaign of the League contributed almost wholly to the final promulgation of that resolution.

From the beginning the Church stood squarely behind it. Dr. Francis Clark, the head of the Christian Endeavor movement, welcomed it at its formation in these words: "The League has a platform wide enough and strong enough for us all to get together on without its breaking down." And so it has proven.

The three great divisions of the work have been agitation, or field-work, legislation, and law enforcement. The chief feature of the field-work was an organized corps of highly developed speakers for every State, kept constantly traveling, speaking in the churches and public auditoriums, whose activities were redoubled as elections approached. One of the taunts of its opponents is that "the League never sleeps." It was early enabled to establish a printing plant at Westville, O., costing $300,000, which for several years past has been turning out five tons of printed matter daily. The "American Issue," its weekly organ, with National and State editions, is printed there. Millions of leaflets and bulletins are also sent out annually. In the legislative work its lawyers have written most of the laws which have finally been passed on the liquor question. In very few instances indeed—so carefully have these been framed—has any judicial opinion been adverse to them. Its triumphant work before the war prepared the country for war-time prohibition; was indeed the great step toward that end. Adjustment would have been far more difficult, the situation indeed would in some instances have taken on a dangerous character, but that the whole country had hearkened to the voice, if they had not as an entire nation enlisted under the banners of the League. The League had helped the cause of prohibition signally, and prohibition, so far as it has advanced, was a signal help to the nation in the war.

Taking advantage of its tremendous opportunity, the League so greatly accelerated its efforts that by the time this country actually entered the war a favorable Congress was in session at Washington. National prohibition was a foregone conclusion, and the result came quickly.

As to its general policy, the League has never claimed that local option by itself was conclusive. A local option victory was always looked on as simply educational—a sample of the full order to be delivered later. The League has proclaimed itself from the first a fighting organization, which, starting with the smallest beginnings, has won its great battles through a succession of small victories. Thorough organization and strenuous action have been its leading characteristics since its formation. Its own statement of its aims declares: "The League is not another temperance society. It is not a rival of any organization, but, as its name implies, a league of organizations. It is a clearing house for churches and temperance societies. Its primary function is not the creation of anti-saloon sentiment, but the direction of existing sentiment to receive immediate results. Its platform is succinctly stated as follows:

"The League holds that the saloon question is something that can and must be solved, and that the only solution is no saloon. It has found that prohibition prohibits better than regulation regulates. It stands for the largest present repression and the speediest ultimate suppression of the beverage liquor traffic. It wastes no time trying to 'reform' the traffic, for an institution which outrages the divine law of love will never obey the police regulations of men. It has no permissive feature in its creed. It is opposed to the license system as vicious in

principle, utterly inconsistent with the purpose of enlightened government, and in practice a protection to a traffic which is inherently criminal in its nature."

ANTISCORBUTICS, remedies against scurvy. Lemon juice, ripe fruit, milk, salts of potash, green vegetables, potatoes, fresh meat, and raw or lightly boiled eggs, are some of the principal antiscorbutics.

ANTI-SEMITES, the modern opponents of the Jews in Russia, Rumania, Hungary, and eastern Germany. An Anti-Semitic League was formed in Berlin in 1881 to restrict the liberty of Jews in Germany. The Emperor interfered to stop the cowardly persecution, but not before thousands of Jews had left the country. The persecution in Russia assumed a more brutal character than in Germany, and thousands of Jews fled to the United States, Spain, and elsewhere. In Hungary violent anti-Jewish riots occurred at Pesth, Zala, and elsewhere, which were not brought to an end until martial law was proclaimed. There is a strong anti-Semitic party feeling in France which the Dreyfus affair served to foster, and it is growing in some quarters in England. Anti-Semitism has come to the fore again in the form of riots and attacks on Jews and their property as a result of the World War. This was especially true in Poland, Austria, Hungary, Rumania, and certain sections of Germany.

ANTISEPSIS, the exclusion of microbes or bacteria from wounds, etc., by the use of antiseptics or other means in order to prevent putrefaction, infection, or blood-poisoning.

ANTISEPTIC, a substance which has the effect of counteracting the tendency to putrefaction. Chemical agents used for other than their medicinal properties. Antiseptics prevent chemical change by destroying the putrefactive microbes or bacteria, the chemical composition of the body still in many cases remaining the same; while disinfectants decompose and remove the infectious matter itself.

ANTISEPTIC SURGERY, treatment to kill germs in accidental wounds, and surgical operations. The use of antiseptic dressings in surgery has become universal. The deaths caused by wounds of all kinds have greatly decreased. In wounds received on the battle-field, the treatment has been especially successful. As is known, the danger lies in inflammation and pus formation, which is caused chiefly by two varieties of germs, the staphylococcus pyogenes. The germ itself does not do the harm, but it secretes a poison which causes inflammation and suppuration. By preventing the entrance of these germs into bullet wounds by the application of first-aid dressings, which soldiers carry with them and use as soon as they are wounded, and by the thorough antiseptic treatment of such wounds by surgeons, the inflammation and suppuration which formerly took so many lives have been most effectively prevented. In the World War the Carrel-irrigating method, by which a wound was constantly laved by an antiseptic fluid, met with extraordinary success.

ANTISPASMODICS, medicines which prevent or allay spasms. Among them may be mentioned valerian, asafœtida, camphor, ammonia, alcohol, ether, chloroform, etc. In all spasmodic diseases, cold baths or sponging, sun-baths, moderate exercise, and a plain but nutritious diet should be employed.

ANTISTHENES (an-tis'the-nēz), a Greek philosopher and the founder of the school of Cynics, born at Athens about B. C. 444. He was first a disciple of Gorgias and then of Socrates. He held virtue to consist in complete self-denial and disregard of riches, honor, or pleasure of every kind. He himself lived as a beggar. He died in Athens at an advanced age.

ANTITHESIS, a sharp opposition of contrast between word and word, clause and clause, sentence and sentence, or sentiment and sentiment, especially designed to impress the listener or reader.

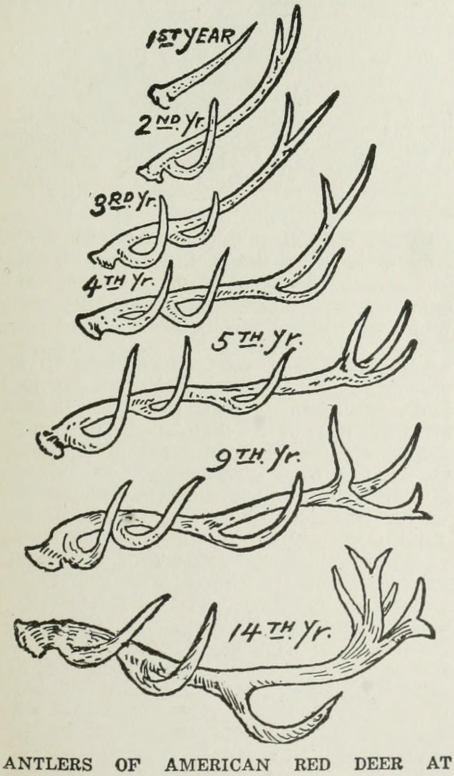
ANTITOXINE, the name given to a remedy for diphtheria. The diphtheritic toxine produced by cultivating the bacillus of diphtheria in broth, in the presence of air, is injected in increasing amounts into an animal, preferably the horse, until it is immunized, or rendered insusceptible to diphtheria. The serum of the animal thus rendered immune may then be injected into the system of a person suffering from diphtheria, with generally successful results. The decrease of deaths from this disease since the introduction of this remedy is remarkable, and in most large cities it is provided free to all unable to pay for the medicine. Among other antitoxines the most important are the antitoxine of tetanus and the antitoxine of snake poison.

ANTI-TRADE, a name given to any of the upper tropical winds which move northward or southward in the same manner as the trade-winds which blow beneath them in the opposite direction. These great aërial currents descend to

the surface after they have passed the limits of the trade-winds, and form the S. W. or W. S. W. winds of the N. temperate, and the N. W. or W. N. W. winds of the S. temperate zones. It is the anti-trade winds that are most notable in the meteorology of the United States.

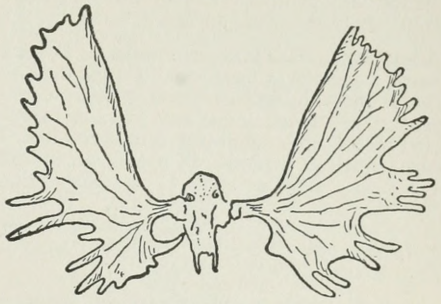
ANTIUM, a maritime city of Latium, now Porto d'Anzio, near Rome; after a long struggle for independence became a Roman colony, at the end of the great Latin war, 340-338 B. C. It is mentioned by Horace, and was a favorite retreat of the emperors and wealthy Romans. The treasures deposited in the Temple of Fortune here were taken by Octavius Cæsar during his war with Antony, 41 B. C.

ANTLERS, bony outgrowths from the frontal bones of almost all of the members of the deer family. Except in the reindeer, they are restricted to the males, and are secondary sexual characters used



ANTLERS OF AMERICAN RED DEER AT VARIOUS STAGES

as weapons in fighting for possession of the females. They appear as a pair of knobs covered with dark skin, from which the bony tissue is developed. In the year after that of birth, the antlers remain unbranched conical "beams." In the following spring, the previous growth



ANTLERS OF MATURE ALASKAN MOOSE

having been meanwhile shed, the antlers grow to a larger size, and from their first branch or "brow." Year by year the number of branches or tines increases, and more than 60 have been counted on some magnificent heads. The soft, hairy skin which secures their rapid annual growth is known as the "velvet," and its accidental injury affects the development of the antlers. Growth ceases when the blood-supply is cut off by the development of a tubercled burr at the base, and the deer then rub off the dry skin and leave the bone bare. The antlers are shed, in many cases at least, annually after the breeding period.

ANTLIA, or ANTLIA PNEUMATICA, one of the 14 southern constellations placed in the heavens by Lacaille in connection with his work at the Cape of Good Hope in 1751-1752. It is situated between Vela, Pyxis, Hydra, and Centaurus.

ANT LION, the larva of an insect (*myrmeleon obsoletus*, etc.) of the order of *neuroptera*, remarkable for its ingenious methods of capturing ants and other insects, on which it feeds, by making pitfalls in the sand. Some species are common in North America. The perfect insect is about an inch long, and has a general resemblance to the dragon-fly. It feeds upon the juices of insects, especially ants, in order to obtain which it cleverly excavates a funnel-shaped pitfall in sandy ground, and lies in wait at the bottom. When insects approach too near to the edge of the hole, the loose sand gives way, so that they fall down the steep slope. It they do not fall quite to the bottom, but begin to scramble up again, the ant-lion throws sand upon them by jerking his head, and thus brings them back. It employs its head in the same way to eject their bodies from its pit, after their juices have been sucked.

ANTOFAGASTA, a province in northern Chile, extending the whole width of the country. Next to the sparsely inhabited Magallanes territory it is the largest province in the country, covering an area of 46,408 square miles. It was ceded by Bolivia to Chile in 1884. It is one of the richest sections of the world in the ores of precious metals. Pop. (1917) 205,662. Antofagasta, its capital and principal seaport, is the terminus of a railroad that extends to the rich mining sections in the northeast. It also ships much ore, nitrate of soda, and bullion, and contains silver-smelting works. Pop. about 60,000.

ANTOMMARCHI, CARLO FRANCESCO (-mar'kē), an Italian physician, born in Corsica in 1780; was Professor of Anatomy at Florence when he offered himself as physician of Napoleon at St. Helena. Napoleon left him a legacy of 100,000 francs. On his return to Europe he published the "Derniers Moments de Napoléon" (2 vols., 1823). He died in 1838.

ANTONINUS PIUS, TITUS AURELIUS FULVUS, Roman emperor, was born at Lavinium near Rome, A. D. 86. In A. D. 120 he became consul, and he was one of the four persons of consular rank among whom Hadrian divided the supreme administration of Italy. He then went as proconsul to Asia. In A. D. 138 he was selected by that emperor as his successor, and the same year he ascended the throne. The persecutions of the Christians he speedily abolished. In Britain he extended the Roman dominion, and stopped the invasions of the Picts and Scots. He died in A. D. 161, and was succeeded by Marcus Aurelius, his adopted son.

ANTONIUS, MARCUS (MARK ANTONY), Roman triumvir, born 83 B. C., was connected with the family of Cæsar by his mother. Debauchery and prodigality marked his youth. To escape his creditors he went to Greece in 58, and from hence followed the Consul Gabinius on a campaign in Syria as commander of the cavalry. He served in Gaul under Cæsar in 52 and 51. In 50 he returned to Rome to support the interests of Cæsar against the aristocratical party headed by Pompey, and was appointed tribune. When war broke out between Cæsar and Pompey, Antony led reinforcements to Cæsar in Greece, and, in the battle of Pharsalia, he commanded the left wing. He afterward returned to Rome with the appointment of master of the horse and governor of Italy (47). In B. C. 44 he became Cæsar's colleague in the consulship. Soon after Cæsar was assassinated, and Antony would have shared the same fate had not Brutus stood up in his behalf. Antony, by the reading of Cæsar's will, and by the oration which he delivered over his body, excited the people to anger and revenge, and the murderers were obliged to flee. After several quarrels and reconciliations with Octavianus, Cæsar's heir (see AUGUSTUS, Antony departed to Cisalpine Gaul, which province had been conferred upon him against the will of the senate. But Cicero thundered against him in his famous Philippics; the senate declared him a public enemy, and intrusted the conduct of the war against him to Octavianus and the consuls Hirtius and Pansa. After a campaign of varied fortunes Antony fled with his troops over the Alps. Here he was joined by Lepidus, who commanded in Gaul, and through whose mediation Antony and Octavianus were again reconciled. It was agreed that the Roman world should be divided among the three conspirators, who were called triumvirs. Antony was to take Gaul; Lepidus, Spain; and Octavianus, Africa and Sicily. Antony and Octavianus departed in 42 for Macedonia, where the united forces of their enemies, Brutus and Cassius, formed a powerful army, which was, however, speedily defeated at Philippi. Antony next visited Athens, and thence proceeded to Asia. In Cilicia he ordered Cleopatra, Queen of Egypt, to apologize for her insolent behavior to the triumviri. She appeared in person, and her charms fettered him forever. He followed her to Alexandria, where he forgot worldly affairs, till he was aroused by a report that hostilities had commenced in Italy between his own relatives and Octavianus. A short war followed, which was decided in favor of Octavianus before the arrival of Antony in Italy. A reconciliation was effected, which was sealed by the marriage of Antony with Octavia, the sister of Octavianus. A new division of the Roman dominions was now made (in 40), by which Antony obtained the East, Octavianus the West. After his return to Asia Antony gave himself up entirely to Cleopatra, assuming the style of an Eastern despot, and so alienating many of his adherents. At length war was declared against the Queen of Egypt, and Antony was deprived of his consulship and government. Antony lost, in the naval battle at Actium (B. C. 31), the dominion of the world. He followed Cleopatra to Alexandria, and, on the arrival of Octavianus his fleet and cavalry deserted, and his infantry was de-

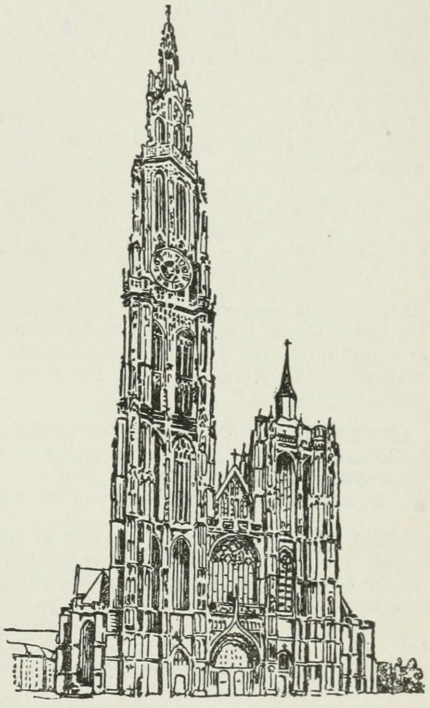
feated. Deceived by a false report which Cleopatra had disseminated of her death, he fell upon his own sword (B. C. 30). On being told that Cleopatra was still alive, he caused himself to be carried into her presence, that he might die in her arms.

ANTONY OF PADUA, ST., was born at Lisbon, Aug. 15, 1195, and, on his father's side, was related to Godfrey of Bouillon. He was at first an Augustinian monk; but in 1220 he entered the Franciscan order, and became one of its most active propagators. He preached in the S. of France and upper Italy, and died at Padua, June 13, 1231. He was canonized by Gregory IX. in the following year. He himself practiced the most severe asceticism, and opposed vigorously the movement for mitigating the severity of the Franciscan rule led by Elias of Cortona.

ANTRIM, a county of Ireland, in the province of Ulster. It has an area of 1,176 square miles, of which about two-thirds are cultivated. It has comparatively little forest land. Salt exists in deposits and there are small coal fields in the interior. There are also rich beds of iron ore. The chief agricultural crop is oats. Fisheries are an important industry. The chief manufactures are woolens, linens, and cotton goods. The principal towns are Lisburn, Ballymena, and Antrim. Belfast was formerly the capital, but in 1898 was made a county borough. Pop. about 480,000.

ANT THRUSH, a name given to certain passerine or perching birds having resemblances to the thrushes and supposed to feed largely on ants. The ant thrushes of the Old World belong to the genus pitta. They inhabit southern and southeastern Asia and the Eastern Archipelago, and are birds of brilliant plumage. The New World ant-thrushes belong to South America.

ANTWERP, the chief port of Belgium, and the capital of a province of the same name on the Scheldt, about 50 miles from the open sea. It is strongly fortified, being completely surrounded on the land side by a semi-circular inner line of fortifications, the defenses being completed by an outer line of forts and outworks. The cathedral, with a spire 400 feet high, one of the largest and most beautiful specimens of Gothic architecture in Belgium, contains Rubens' celebrated masterpieces, the "Descent from the Cross," the "Elevation of the Cross," and "The Assumption." The other churches of note are St. James', St. Andrew's, and St. Paul's, all enriched with paintings by Rubens, Vandyke, and other masters. Among the other edifices of note are the exchange, the town hall, the palace, theater, academy of the fine arts, picture and sculpture galleries, etc. The harbor accommodation is extensive and excellent. Antwerp's commerce before the World War was one of the



THE CATHEDRAL AT ANTWERP, BELGIUM

largest in Europe, though much of it was transit. It exceeded $1,200,000,000 annually. Antwerp is mentioned as early as the 8th century, and in the 11th and 12th it had attained a high degree of prosperity. The wars between the Netherlands and Spain greatly injured its commerce. In August, 1914, the German forces defeated the Belgian and British troops defending the city and occupied it until the last of October, 1918. See WORLD WAR. Pop. about 400,000. The province consists of a fertile plain 1,093 square miles in area; pop. about 1,000,000.

ANURA, or **ANOURA**, an order of batrachians which lose the tail when they reach maturity, such as the frogs and toads.

ANUS, the opening at the lower or posterior extremity of the alimentary canal through which the excrement or waste

products of digestion are expelled. With regard to its anatomy, it is sufficient to state that it is kept firmly closed on ordinary occasions by the external and internal sphincter muscles, the former of which contracts the integument around the opening, and, by its attachment to the coccyx behind, and to a tendinous center in front, helps the levator ani muscle in supporting the aperture during the expulsive efforts that are made in the passage of the fæces or intestinal evacuations; while the latter, or internal sphincter, is an aggregation of the circular muscular fibers of the lowest part of the rectum, and acts in contracting the extremity of the tube. The integument around the anus lies in radiating plaits, which allow of its stretching without pain during the passage of the fæces; and the margin is provided with a number of sebaceous glands.

ANZAC, a name applied to Australian and New Zealand troops in the World War and made up of the first letters of their title, "Australian and New Zealand Army Corps."

AONIA (ā-ō'nē-a), in ancient geography a name for part of Bœotia in Greece, containing Mount Helicon and the fountain Aganippe, both haunts of the muses.

AORIST, the name given to one of the tenses of the verb in some languages (as the Greek) which expresses indefinite past time.

AORTA, the largest artery in the human body, and the main trunk of the arterial system itself. It takes its departure from the upper part of the left ventricle of the heart, whence it runs upward and to the right, at that part of its progress being called the ascending aorta; then it turns to the left, passes the spinal column, and bending downward forms the arch of the aorta. Continuing its course along the left of the spine, it is called the descending aorta. Passing through the aperture in the diaphragm into the abdomen, it becomes the abdominal aorta. Finally, it bifurcates about the fourth pair of lumbar vertebræ, and forms the two primitive iliac arteries. Upward from the heart the ramifications are numerous and exceedingly important. The aorta has three valves called the sigmoid or semi-lunar valves, to prevent the reflux of the blood into the heart.

AOSTA (a-os'ta), a cathedral city of Italy, on the Dora Baltea, 19 miles from the opening of the great St. Bernard Pass, and 80 miles N. N. W. of Turin by rail. It is surrounded by rich orchards, vineyards, and almond plantations. It is the ancient Augusta Prætoria; and several monuments of the Roman times still remain. St. Bernard was Archdeacon of Aosta; and here Anselm, Archbishop of Canterbury, was born. Near by are the celebrated baths and mines of St. Didier. The beautiful valley of Aosta is rich in woods, pastures, minerals, and mineral walls. French is generally spoken. Pop. about 7,000.

AOUDAD, the *ammotrogus tragelaphus*, a remarkable species of sheep, with certain affinities to the goats. It is of a reddish-brown color, with much long hair hanging down from the front of the neck and the base of the forelegs. It has long, powerful horns, and is fierce in character. It inhabits mountainous regions in Abyssinia and Barbary.

APACHES (ap-ä'chēz), a tribe of North American Indians, formerly very fierce and numerous, living in portions of Texas, New Mexico, and Arizona, and belonging to the Athabascan family. Long after the annexation of their territory by the United States they continued their raids in spite of severe defeats. An attempt made by the United States Government to confine the Apaches within a reserved territory in Arizona led to bloodshed in 1871. About 300 now occupy a reservation at Fort Sill, Okla. Their total number is about 5,000.

APARTMENT HOUSE, a structure built to accommodate a number of families each in its own set of rooms, which form a separate dwelling with an entrance of its own. The term is chiefly used in the United States, though houses of this kind have long been built in Europe.

APATITE, a translucent but seldom transparent mineral. It passes through various shades of color, from white to yellow, green, blue, and occasionally red. It is now largely utilized as a source of artificial phosphate manures.

APE, a common name of a number of quadrumanous animals inhabiting the Old World (Asia and the Asiatic islands, and Africa). and including a variety of species. The family includes the chimpanzee, gorilla, orang-outang, etc., and has been divided into three genera, *troglodytes*, *simia*, and *hylobates*.

The highest and most man-like monkeys, including gorilla, chimpanzee, orang-outang, gibbon, and several other species, are called *Anthropoid Apes*. They are all arboreal, and inhabit Africa, southeastern Asia, and the Malay Archi-

pelago. In all, about a dozen species have been described with more or less definiteness. It is recognized by anatomists that all the attempts to establish a fundamental distinction, on anatomical grounds, between the physical structure of the higher apes and that of man are futile. Generic differences, indeed, there are in abundance, but these establish only a difference of degree, and not of kind. Thus, in man, the great toe is not opposable to the others for grasping purposes, the angle between the face and the top of the skull does not exceed 120°, the teeth form an uninterrupted series, and so on; while the strong spines on the back of the gorilla's neck, the very marked eyebrow ridges in gorilla and chimpanzee, the especially long arms of the gibbon, and the protruding jaws of all of the anthropoids, are equally characteristic adaptations to different ways of life. The difference of structure between the lowest monkeys and the higher are far greater than those between man and any anthropoid ape.

On the other hand, while it is impossible to establish any fundamental distinction in physical structure between homo and the anthropomorpha, there is among evolutionists an equal consensus of opinion as to the impossibllity of regarding an ape of any existing anthropoid species as in the direct line of human ancestry. As regards brain structure, the most man-like ape is the orang, while the chimpanzee has the most closely related skull, the gorilla the most human feet and hands, the gibbon the most similar chest.

APELLES (a-pel'ēz), the most famous of the painters of ancient Greece and of antiquity, was born in the 4th century B. C., probably at Colophon. Ephorus of Ephesus was his first teacher, but, attracted by the renown of the Sicyonian school, he went and studied at Sicyon. In the time of Philip he went to Macedonia, and there a close friendship between him and Alexander the Great was established. The most admired of his pictures was that of Venus rising from the sea and wringing the water from her dripping locks. His portrait of Alexander with a thunderbolt in his hand was no less celebrated. His renown was at its height about B. C. 330, and he died about the end of the century.

APENNINES (ap'en-īns), a prolongation of the Alps, forming the "backbone of Italy." Beginning at Savona, on the Gulf of Genoa, the Apennines traverse the whole of the peninsula and also cross over into Sicily, the Strait of Messina being regarded merely as a gap in the chain. The average height of the mountains composing the range is about 4,000 feet, and nowhere do they reach the limits of perpetual snow, though some summits exceed 9,000 feet in height. Monte Corno, called also Gran Sasso d'Italia (Great Rock of Italy), which rises among the mountains of the Abruzzi, is the loftiest of the chain, rising to the height of 9,541 feet, Monte Majella (9,151) being next. Monte Gargano, which puts out into the Adriatic from the ankle of Italy, is a mountainous mass upward of 5,000 feet high, completely separated from the main chain. On the Adriatic side the mountains descend more abruptly to the sea than on the W. or Mediterranean side, and the streams are comparatively short and rapid. On the W. side are the valleys of the Arno, Tiber, Garigliano, and Volturno, the largest rivers that rise in the Apennines, and the only ones of importance in the peninsular portion of Italy. They consist almost entirely of limestone rocks, and are exceedingly rich in the finest marbles. On the S. slopes volcanic masses are not uncommon. Mount Vesuvius, the only active volcano on the continent of Europe, is an instance. The lower slopes are well clothed with vegetation, the summits are sterile and bare.

APEPI (ap-ā'pē), in heathen mythology, the Great Serpent or Typhon, the embodiment of evil.

APERIENT, a medicine which, in moderate doses, gently but completely opens the bowels; examples, castor-oil Epsom salts, senna, etc.

APERTURE, in anatomy, zoölogy, botany, etc.: (a) The aperture of a univalve shell is the opening or mouth. In mollusks which feed on vegetable matter it is entire; while in those which are animal feeders it has a notch or canal. In some families it has an operculum or cover. The margin of the aperture is called the peristome. (b) Any other opening.

In optics, the diameter of the object-glass of a refracting telescope, or the speculum or mirror of a reflector. The larger the aperture (*i. e.*, the area of the surface through which the light is transmitted, or from which it is reflected), the greater is the power of the telescope to penetrate into space and consequently bear higher magnifying powers. The great refractor at the United States Ob servatory at Washington has an aperture of 26 inches. In recent years silver-glass parabolic mirrors of the Newtonian form have been constructed with large apertures and short focal

length, thus rendering these instruments exceedingly convenient for use. Sir W. Herschel's 18-inch metallic speculum, used for examining the nebulæ and Milky Way, had a focal length of 20 feet; modern telescopes, with silvered-glass mirrors, have been constructed of the same aperture, but with a focal length of not more than seven feet.

Angular aperture (in microscopes), the amount of light transmitted by the objective, and, consequently, the distinctness of the image afterward magnified by the lenses forming the eye piece. When an objective of the large angular aperture is employed, the more delicate markings of the object under examination, invisible when objectives of less angular aperture are used, are seen with great distinctness.

APE'S HILL (*Arabic, Jebel Zatus*), the ancient Abyla, the extremity of a mountain range in the N. of Morocco, opposite Gibraltar; one of the "Pillars of Hercules."

APHANIPTERA (af-an-ip'ter-a), an order of wingless insects, called by De Geer *suctoria*, and by Leach *siphonaptera*. They have a sucker of three pieces, and a true metamorphosis. The thorax is distinctly separated from the abdomen, and two horny plates mark the spots where in the higher insects wings would be. It contains the *pulicidæ*, or fleas.

APHASIA, in pathology, a symptom of certain morbid conditions of the nervous system, in which the patient loses the power of expressing ideas by means of words, or loses the appropriate use of words, the vocal organs the while remaining intact and the intelligence sound. In one form of the disease, called aphemia, the patient can think and write, but cannot speak; in another, called agraphia, he can think and speak, but cannot express his ideas in writing. The treatment is that of the underlying disease.

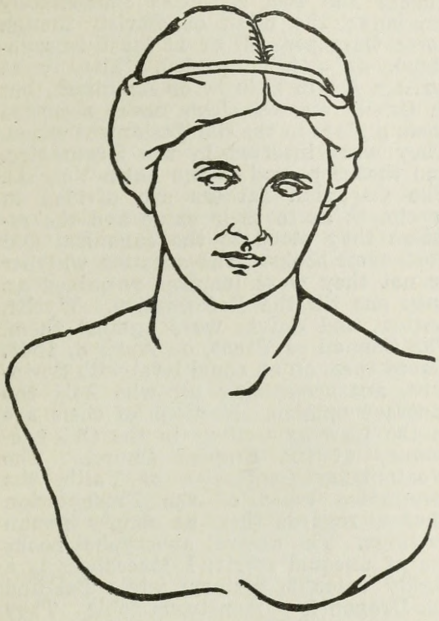
APHELION, that part of the orbit of the earth or any other planet in which it is at the point remotest from the sun.

APHIS (ā'fis), a genus of insects, the typical one of the family *aphidæ*. It contains those soft pulpy little animals, winged or wingless, and with long antennæ, which are seen beneath the leaves, or in curled-up leaves, or in the axils of many plants, or even on the roots of some. Sometimes, as in the case of the elm, their destructive operations upon a leaf raise a gall of considerable size. The species are very numerous, and are generally called after the plants on which they feed, as *A. rosæ*, the aphis of the rose; *A. fabæ*, the bean aphis; *A. brassicæ*, the cabbage fly; *A. humuli*, the hopfly. They are exceedingly prolific, but are kept within bounds by various insects, especially by the *coccinellidæ*, or lady birds, of which they are the appropriate food. They drop a fluid called honey-dew, which is so grateful to the ants that the latter, to receive it, tend them like milch cows. The mode of propagating their race is the abnormal one described as alternation of generations, metagenesis, and parthenogenesis. The winged aphides, confessedly perfect insects, bring forth a wingless race, apparently mere larvæ, and which therefore, it might be thought, would be incapable, while thus immature, of bringing forth young. In certain cases they do it, however, and their offspring are winged, and as perfect as their grandparents. This alternation of generations, or metagenesis, with its attendant parthenogenesis (or birth from virgins) in every second generation, goes on for nine or ten generations by which time the season is over. The last aphides of the year are fully formed and winged, and deposit eggs, which are hatched in spring.

APHONIA, in pathology, the greater or less impairment, or the complete loss of the power of emitting vocal sound. The slightest and less permanent forms often arise from extreme nervousness, fright, and hysteria. Slight forms of structural aphonia are of a catarrhal nature, resulting from more or less congestion and tumefaction of the mucous and sub-mucous tissues of the larynx and adjoining parts.

APHRODITE (af-rō-dī'tē), one of the chief divinities of the Greeks, the goddess of love and beauty, so called because she was sprung from the foam *aphros* of the sea. She was the wife of Hephæstus, but she loved besides, among gods, Ares and Dionysus, and among mortals, Anchises and Adonis. The chief places of her worship in Greece were Cyprus and Cythera. In earlier times the patroness of marriage and maternity, she became later the ideal of graceful womanhood, and was spiritualized by Plato as Aphrodite Urania. By others she was degraded in Aphrodite Pandemos to be the patroness of mere sensual love. The worship of Aphrodite was originally the symbol of the fructifying powers of nature. Her cult was introduced by the Phoenicians into Cyprus, and soon spread over all Greece. She was originally identical with Astarte, the Ashtoreth of the Hebrews. By the Romans she was identified with

Venus, hitherto one of the least important Roman divinities (see VENUS). The finest statues of the goddess that still



APHRODITE

exist are those of Melos (Milo) at Paris, of Capua at Naples, and of the Medici at Florence.

APIA (ā'pē-a), the principal town and commercial emporium of the Samoan Islands in the South Pacific Ocean; on the N. coast of the island of Upolu, about midway between the E. and W. extremities of the island. In March, 1899, a hurricane swept the harbor; wrecked the United States war vessels "Trenton" (flagship) and "Vandalia," and the German men-of-war, "Eber" "Adler," and "Olga"; and drove the United States steamer "Nipsic" ashore, greatly injured. The British ship "Calliope" was the only man-of-war in the harbor that succeeded in escaping to sea. In 1889 the town was the scene of fatal riots growing out of the struggle of Mataafa and Malietoa Tanus for the kingship. In 1900 the town came into German control, but as a result of the World War is now occupied by New Zealand. Pop., 1,500. See SAMOAN ISLANDS.

APIARY, a place for keeping bees. The apiary should be well sheltered from strong winds, moisture, and the extremes of heat and cold. The hives should face the S. or S. E., and should be placed on shelves two feet above the ground, and about the same distance from each other. The old dome-shaped straw skep is still in general use among the cottagers of Great Britain. Its cheapness and simplicity of construction are in its favor, while it is excellent for warmth. It has the disadvantage that its interior is closed to inspection, and the honey can only be got out by stupefying the bees with smoke or chloroform, or by fumigating with sulphur, which entails the destruction of the swarm. Wooden hives of square, boxlike form are now gaining general favor among bee keepers. They usually consist of a large breeding chamber below and two sliding removable boxes called supers above for the abstraction of honey without disturbing the contents of the main chamber. When their stores of honey are removed the bees must be fed during the winter and part of spring with syrup or with a solution consisting of two pounds loaf sugar to a pint of water. See BEE.

APIOS, a North American plant of the pea order (*Leguminosæ*), with tuberous, starchy, edible rhizomes. Attempts at cultivation have not been to any practical extent successful.

APIS (ā'pis), in entomology, the typical genus of the family *apidæ* and the hymenopterous tribe anthophila. The *A. mellifica*, from Latin *melificus*, *a.*= honey-making (*mel*=honey, and *facio*= to make), is the hive bee.

In astronomy, a small constellation in the Southern Hemisphere, first named by Halley. It is called also Musca, literally =the fly, but in this case rendered "the bee."

APIS, a bull to which divine honors were paid by the ancient Egyptians, who regarded him as a symbol of Osiris. At Memphis he had a splendid residence, containing extensive walks and courts for his entertainment, and he was waited upon by a large train of priests, who looked upon his every movement as oracular. He was not suffered to live beyond 25 years, being secretly killed by the priests and thrown into a sacred well. Another bull, characterized by certain marks, as a black color, a triangle of white on the forehead, a white cresent-shaped spot on the right side, etc., was selected in his place. His birthday was annually celebrated, and his death was a season of public mourning. Belzoni found a colossal sarcophagus of alabaster, which is now in the British Museum, and in the same apartment the body of a bull, embalmed in asphaltum.

APIUM, a genus of umbelliferous plants, including celery.

APLACENTAL, a term applied to those mammals in which the young are destitute of a placenta. The aplacental mammals comprise the *monotremata* and *marsupialia*, the two lowest orders of mammals, including the duck mole (*ornithorhynchus*), the porcupine ant-eater, kangaroo, etc.

APLANATIC, in optics, a term specifically applied to reflectors, lenses, and combinations of them, capable of transmitting light without spherical aberration. An aplanatic lens is a lens constructed of different media to correct the effects of the unequal refrangibility of the different rays.

APO, a volcano in Mindanao, Philippine Islands; over 10,000 feet high.

APOCALYPSE (a-pok'a-lips), the name frequently given to the last book of the New Testament, in the English version called the Revelation of St. John the Divine. It is generally believed that the Apocalypse was written by the apostle John in his old age (95-97 A. D.) in the Isle of Patmos, whither he had been banished by the Roman Emperor Domitian.

APOCALYPTIC WRITINGS, writings such as, like the prophecies of Daniel, their prototype, set forth in a figurative and pictorial manner the future progress and completion of the world's history, especially in its religious aspect. The two apocalyptic books received into the canon of Scripture are the books of Daniel and the Apocalypse especially so-called, the Revelation of St. John. But Jewish and early Christian literature produced numerous apocalypses from about 170 B. C. to 130 A. D. The Book of Enoch is the best known of the non-canonical Jewish apocalypses; it dates from the later Maccabee period; another is the apocalypse of Ezra. The "Shepherd of Hermas" is the most important Christian work of this kind.

APOCRYPHA (a-pok'rif-a), in the early Christian Church, (1) books published anonymously; (2) those suitable for private rather than public reading; (3) those written by an apostle or other inspired author, but not regarded as part of Scripture; (4) the works of heretics.

In English now, the following 14 books: I, 1 Esdras; II, 2 Esdras; III, Tobit; IV. Judith; V. Additions to Esther; VI, The Wisdom of Solomon; VII, Ecclesiasticus, called also the Wisdom of Jesus, the son of Sirach; VIII, Baruch; IX, The Song of the Three Holy Children; X, The History of Susanna; XI, Bel and the Dragon; XII, The Prayer of Manasseh, King of Juda; XIII, 1 Macoabees; and XIV, 2 Maccabees. Most of the above-mentioned books were composed during the two centuries immediately preceding the birth of Christ, though some were penned, or at least interpolated, at a later period. They were written not in Hebrew or Aramæan, but in Greek; and the Jews never accorded them a place in the Old Testament canon. They were inserted in the Septuagint, and thence passed to the Latin Vulgate. The Christian fathers are divided in sentiment as to their value and the relation they stood to the canonical Old Testament books. The question whether or not they were inspired remained an open one till the Reformation. Wyclif, Luther, and Calvin were against them. The Council of Trent, on April 8, 1546, placed them on an equal level with Scripture, anathematizing all who held the contrary opinion. Portions of them are in the New as well as in the Old Lectionary of the English Church. The Westminster Confession of Faith, the formulated creed of the Presbyterian Church, regards them as simply human writings. The several apocryphal books are of unequal merit; I Maccabees is a highly valuable history; while Bel and the Dragon is a monstrous fable. They throw much light on the religious opinions and the political state of the Jews before the advent of Christ. The Greek Church prohibits their use.

APOCYNACEÆ (ap-ō-sin-as'ē-ī), an order of plants, the English dog-banes. Of 100 known genera only one, *vinca*, is found in England; the rest are to be found in warmer countries.

APODA, in zoölogy (1) Aristotle's third section of *zoötoka*, or air-breathing vivipara. It included the whales, which the Stagirite, with remarkable scientific accuracy, ranked with the warm-blooded quadrupeds; (2) the second order of the class *amphibia*, or *batrachia*. The body is like that of an earthworm, and is quite destitute of feet. The order contains but one family, the *cæciliadæ;* (3) according to Prof. Max Müller, a group of fishes belonging to the sub-order *physostomata*. It is so called because the ventral fins are wanting. It contains three families, the *murænidæ*, or eels, the *gymnotidæ*, and the *symbranchidæ*.

APODAL FISHES, the name applied to such malacopterous fishes as want ventral fins. They constitute a small natural family, of which the common eel is an example.

APOGEE, that point in the orbit of the moon or a planet where it is at its

greatest distance from the earth; properly this particular part of the moon's orbit.

APOLLINARIS WATER, a natural aërated water, belonging to the class of acidulated soda waters, and derived from the Apollinarisbrunnen, a spring in the valley of the Ahr, near the Rhine, in Rhenish Prussia.

APOLLO, son of Zeus (Jupiter) and Leto (Latona), who being persecuted by the jealousy of Hera (Juno), after tedious wanderings and nine days' labor was delivered to him and his twin sister, Artemis (Diana), on the island of Delos.



THE APOLLO BELVEDERE IN THE VATICAN, ROME

Skilled in the use of the bow, he slew the serpent Python on the fifth day after his birth; afterward, with his sister Artemis, he killed the children of Niobe. He aided Zeus in the war with the Titans and the giants. He destroyed the Cyclopedes, because they forged the thunderbolts with which Zeus killed his son and favorite, Asklepios (Æsculapius). According to some traditions he invented the lyre, though this is generally ascribed to Hermes (Mercury). Apollo was originally the sun-god; and though in Homer he appears distinct from Helios (the sun), yet his real nature is hinted at even here by the epithet Phœbus, that is, the radiant or beaming. In later times the view was almost universal that Apollo and Helios were identical. From being the god of light and purity in a physical sense he gradually became the god of moral and spiritual light and purity, the source of all intelectual, social, and political progress. He thus came to be regarded as the god of song and prophecy, the god that wards off and heals bodily suffering and disease, the institutor and guardian of civil and political order, and the founder of cities. His worship was introduced at Rome at an early period, probably in the time of the Tarquins. Among the ancient statues of Apollo that have come down to us, the most remarkable is the one called the Apollo Belvedere, from the Belvedere gallery in the Vatican at Rome. This statue was found in the ruins of Antium in 1503, and was purchased by Pope Julius II. It is now supposed to be a copy of a Greek statue of the 3d century B. C., and dates probably from the reign of Nero.

APOLLODORUS, a Greek writer who flourished 140 B. C. Among the numerous works he wrote on various subjects, the only one extant is his "Bibliotheca," which contains a concise account of the mythology of Greece down to the heroic age.

APOLLONIUS OF RHODES, a Greek poet, born in Egypt, but long residing at Rhodes, where he founded a school of rhetoric. He afterward became keeper of the famous library of Alexandria, B. C. 149. He wrote a poem called "Argonautica," which is still extant.

APOLLOS, a Jew of Alexandria, who learned the doctrines of Christianity at Ephesus from Aquila and Priscilla, became a preacher of the gospel in Achaia and Corinth, and an assistant of Paul in his missionary work. Some have regarded him as the author of the Epistle to the Jews.

APOLOGETICS, the department of theology which treats of the establishment of the evidences and defense of the doctrines of a faith. Christian apologetics, generally called simply apologetics, treats of the evidences of Christianity, and seeks to establish the truth of the Bible and the doctrines educed from it.

APONEUROSIS, in anatomy, a name of certain grayish-white shining membranes, composed of interlacing fibers, sometimes continuous with the muscular fiber, and differing from tendons merely in having a flat form. They serve several purposes, sometimes attaching the muscles to the bones, sometimes surrounding the muscle and preventing its displacement, etc.

APOPHYGE (ap-of'e-gē or ap'ō-fīg), in architecture, the small curve at the top of a column by which its shaft joins its capital. It is sometimes called the spring of the column. Originally it was the ring which bound the extremities of wooden pillars to keep them from splitting, imitated in stone-work. The same name is given to the corresponding concavity connecting the bottom of a pillar with the fillet at its base.

APOPHYLLITE (ap-of'il-īt), a tetragonal mineral, called also ichthyophthalmite, classed by Dana as the type of an apophylite group of unisilicates. Color, white or grayish; occasionally with greenish, yellowish, rose-red or flesh-red tint. It is generally transparent; is brittle, and has feeble double refraction. It is "hydrated calceopotassic silicate." It occurs chiefly in amygdaloid, though occasionally in granite and gneiss. It is found at Ratho, near Edinburgh, and in Fife, Dumbarton and Inverness-shires. It occurs in Europe, in India, in Siberia, in America, in Australia and elsewhere.

APOPLEXY, a serious malady, coming on so suddenly and so violently that anciently anyone affected by it was said to be *attonitus* (thunderstruck), or *sideratus* (planet-struck). The disease now described is properly called cerebral apoplexy, the cerebrum or brain being the part chiefly affected.

APOSTLE, one who is sent off or away from; one sent on some important mission; a messenger; a missionary. The name given, in the Christian Church, to the 12 men whom Jesus selected from His disciples as the best instructed in His doctrines, and the fittest instruments for the propagation of his religion. Their names were as follows: Simon Peter (Greek of Caiphas, the rock), and Andrew, his brother; James the greater, and John, his brother, who were sons of Zebedee; Philip of Bethsaida, Bartholomew, Thomas, Matthew; James, the son of Alpheus; commonly called James the less; Lebbeus, his brother, who was surnamed Thaddeus, and was called Judas, or Jude, Simon the Canaanite, and Judas Iscariot. Of this number, Simon Peter, John, James the greater, and Andrew were fishermen; and Matthew, a publican or taxgatherer. When the apostles were reduced to 11 by the suicide of Judas, who had betrayed Christ, they chose Matthias by lot, on the proposition of St. Peter. Soon after, their number became 13, by the miraculous vocation of Saul, who, under the name of Paul, became one of the most zealous propagators of the Christian faith. The Bible gives the name of apostle to Barnabas also, who accompanied Paul on his missions (Acts, xiv: 13), and Paul bestows it also on Andronicus and Junia, his relations and companions in prison. In a still wider sense, preachers who first taught Christianity in heathen countries, are sometimes termed apostles; *e. g.*, St. Denis, the apostle of the Gauls; St. Boniface, the apostle of Germany; the monk Augustine, the apostle of England; the Jesuit Francis Xavier, the apostle of the Indies; Adalbert of Prague, the apostle of Prussia proper. Paul was the only apostle who had received a scientific education; the others were mechanics. Peter, Andrew, and John are called in the Scriptures (Acts iv: 13), *homines sine literis idiotæ*. Peter employed his disciple St. Mark in writing the Gospel which bears his name.

APOSTLES' ISLANDS, or THE TWELVE APOSTLES, a group of 27 islands in Lake Superior. They belong to Wisconsin. The principal islands of the group are Ile au Chene, Stockton, Bear, Madeline, and Outer. They have an area of 200 square miles. Brown sandstone is exported, and the islands are covered with a rich growth of timber. La Pointe, on Madeline island, formerly the county-seat of Ashland county, Wis., was settled by the French in 1680.

APOSTOLIC, or APOSTOLICAL, pertaining or relating to the apostles.

Apostolic Church.—The Church in the time of the apostles, constituted according to their design. The name is also given to the four churches of Rome, Alexandria, Antioch, and Jerusalem, and is claimed by the Roman Catholic Church, and occasionally by the Episcopalians.

Apostolic Constitutions and Canons.—A collection of regulations attributed to the apostles, but generally supposed to be spurious. They appeared in the 4th century; are divided into eight books, and consist of rules and precepts relating to the duty of Christians, and particularly to the ceremonies and discipline of the Church.

Apostolic Delegate.—A permanent representative of the Pope in a foreign country. It is sometimes confounded with the word ablegate, the latter meaning a temporary representative of the Pope for some special function.

Apostolic Fathers.—The Christian writers who, during any part of their lives, were contemporary with the apostles. There are five—Clement, Barnabas. Hermas, Ignatius, Polycarp.

Apostolic King.—A title granted by the Pope to the Kings of Hungary, first conferred on St. Stephen, the founder of the royal line of Hungary, on account of what he accomplished in the spread of Christianity.

Apostolic See.—The see of the Popes or Bishops of Rome; so called because the Popes profess themselves the successors of St. Peter, its founder.

Apostolic Succession.—The uninterrupted succession of bishops, and, through them, of priests and deacons (these three orders of ministers being called the apostolical orders), in the Church by regular ordination from the first apostles down to the present day. All Episcopal churches hold theoretically, and the Roman Catholic Church and many members of the English Church strictly, that such succession is essential to the officiating priest, in order that grace may be communicated through his administrations.

APOSTOLICS, APOSTOLICI, or APOSTOLIC BRETHREN, the name given to certain sects who professed to imitate the manners and practice of the apostles. The last and most important of these sects was founded about 1260 by Gerhard Segarelli of Parma. They went barefooted, clothed in white, with long beard, disheveled hair, and bare heads, accompanied by women called spiritual sisters, begging, preaching and singing, throughout Italy, Switzerland, and France; announced the coming of the kingdom of heaven and of purer times; denounced the papacy, and its corrupt and worldly church; and inculcated the complete renunciation of all worldly ties, of property, settled abode, marriage, etc. This society was formally abolished (1286) by Honorius IV. In 1300 Segarelli was burned as a heretic, but another chief apostle appeared—Dolcino, a learned man of Milan. In self-defense they stationed themselves in fortified places whence they might resist attacks. After having devastated a large tract of country belonging to Milan they were subdued, A. D. 1307, by the troops of Bishop Raynerius, in their fortress Zebello, in Vercelli, and almost all destroyed. Dolcino was burned. The survivors afterward appeared in Lombardy and in the south of France as late as 1368.

APOTHECARY, the name formerly given in England and Ireland to members of an inferior branch of the medical profession. The apothecary was in England a licentiate of the Apothecaries' Society of London; in Ireland, a licentiate of the Apothecaries' Hall of Ireland. Up to a comparatively recent period, however, no inconsiderable proportion of those who practiced as apothecaries, at any rate in England, were persons practicing without any license. The licensed apothecary frequently kept a shop in which he sold drugs and made up medical prescriptions, in this respect competing with the chemist and druggist. But he was entitled to attend sick persons, and prescribe for them; and though it was the almost universal practice of apothecaries to charge their patients only for medicines supplied, they had the alternative of charging for their attendances, but could not charge for both. The term apothecary has been long in disuse.

Anciently, the apothecaries were not distinguishable from the grocers (the surgeons being, in like manner, undistinguishable from the barbers); and it was not till 1617, in the 13th year of James I., that these bodies were formed into two distinct corporations. A statute of 1815 enacted that no person should practice as an apothecary, or act as an assistant to an apothecary, in any part of England or Wales, unless he had been examined by a court of examiners, and had received therefrom a certificate. An act of 1874 amended the act of 1815, and gave the Apothecaries' Society power to co-operate with other medical licensing bodies in granting licenses.

APOTHECIUM, the scutella or shields constituting the fructification of some lichens. They are little colored cups or lines with a hard disk, surrounded by a rim, and containing asci or tubes filled with sporules.

Also the cases in which the organs of reproduction in the *algaceæ,* or sea weeds, are contained.

APOTHEOSIS, a deification; the placing of a prince or other distinguished person among the heathen deities. It was one of the doctrines of Pythagoras, which he had borrowed from the Chaldees, that virtuous persons, after their death, were raised into the order of the gods. The Romans, for several centuries, deified none but Romulus, and first imitated the Greeks in the fashion of frequent apotheosis after the time of Augustus Cæsar. From this period apotheosis was regulated by the decrees of the senate. It became at last so frequent as to be an object of contempt. The period of the Roman emperors, so rich in crime and folly, offers the most infamous instances of apotheosis. After Cæsar, the greater part of the Roman emperors were deified. The same hand which had murdered a predecessor often placed him among the gods.

APPALACHIAN MOUNTAINS (ap-pa-lā'-chē-an), also called Alleghenies, a vast mountain range in North America, extending for 1,300 miles from Cape Gaspé, on the Gulf of St. Lawrence, S. W. to Alabama. The system has been divided into three great sections: the northern (including the Adirondacks, the Green Mountains, the White Mountains, etc.), from Cape Gaspé to New York; the central (including a large portion of the Blue Ridge, the Alleghenies proper, the numerous lesser ranges), from New York to the valley of the New river; and the southern (including the continuation of the Blue Ridge, the Black Mountains, the Smoky Mountains, etc.), from the New river southward. The chain consists of several ranges generally parallel to each other, the altitude of the individual mountains increasing on approaching the South. The highest peaks rise over 6,600 feet (not one at all approaching the snow level), but the mean height is about 2,500 feet. Lake Champlain is the only lake of great importance in the system, but numerous rivers of considerable size take their rise here. Magnetite, hematite, and other iron ores occur in great abundance, and the coal measures are among the most extensive in the world. Gold, silver, lead, and copper are also found, while marble, limestone, fire clay, gypsum, and salt abound. The forests yield large quantities of valuable timber, such as sugar maple, white birch, beech, ash, oak, cherry tree, white poplar, white and yellow pine, etc.

APPALACHICOLA (-chi-cō-la), a river of the United States, formed by the Chattahoochee and Flint rivers, which unite near the northern border of Florida; length, about 100 miles; flows into the Gulf of Mexico, and is navigable.

APPARITION, according to a brief held by some, a disembodied spirit manifesting itself to mortal sight; according to the common theory an illusion involuntarily generated, by means of which figures or forms, not present to the actual sense, are nevertheless depictured with a vividness and intensity sufficient to create a temporary belief of their reality. Such illusions are now generally held to result from an overexcited brain, a strong imagination, or some bodily malady. This theory explains satisfactorily a large majority of the stories of apparitions. Belief in spirits, visible and invisible, still persists, and an increase in the followers of spiritualism has been noted since the European War of 1914-1918.

APPEAL, an application for the transfer of a cause or suit from an inferior to a superior court or judge. It differs from a writ of error in two respects: (1) That an appeal may be brought on any interlocutory matter, but a writ of error only on a definite judgment. (2) That on writs of error, the superior court pronounces the judgment, while on appeals it gives directions to the court below to rectify its decree. (Blackstone's "Commentaries," book iii, ch. 4.)

In the United States, the distinction between an appeal, which originated in the civil law, and a writ of error, which is of common law origin, is that the former carries the whole case for review by the higher court, including both the facts and the law; while the latter removes only questions of law. An act of Congress of 1875 provides that the judgments and decrees of the Circuit Courts of the United States shall not be re-examined in the Supreme Court unless the matter in dispute shall exceed the sum or value of $5,000, exclusive of costs. No judgment, decree or order of a circuit or district court, in any civil action at law or in equity, shall be reviewed in the Supreme Court on writ of error or appeal, unless the writ of error is brought, or the appeal is taken, within two years after the entry of such judgment, decree, or order; save in the case of infants, insane persons, and imprisoned persons, when the period is two years, exclusive of this term of disability. An appeal from a district court to a circuit court of the United States must be taken within one year. An appeal from the district court in admiralty to the circuit court must be made immediately after the decree, in open court, before the adjournment *sine die;* and it should be taken to the next succeeding circuit court. An appeal may be taken from the State courts to the Supreme Court of the United States, in cases involving the validity of a treaty or statute of, or authorized under, the United States; on the ground of repugnance to the constitution, etc.

APPENDICITIS, a disease caused by inflammation, suppuration, and consequent gangrene in the tissue of the vermiform appendix, usually due to insufficient circulation of blood in the part itself. The interior of the appendix is big enough to admit only a medium sized darning needle. The interior caliber of the appendix is, however, often found dilated and containing foreign material. The common belief that appendicitis is caused by the introduction of a grape or orange seed or some other seed into the appendix is practically erroneous, since such causes are extremely rare. It is true, nevertheless, that occasionally seeds, bits

of bone, small shot, gallstones, beans, pins and other objects have caused fatal perforation of the appendix.

The appendix is an organ which appears to have no actual use in the present machinery of man, but in the earlier stages of man's development it is believed to have been a large pouch which played an important part in the digestive operations of the human system. By ages of disuse it has gradually shrunk to its present dimensions, and is known to science as a vestigral organ. It is one of the most delicate and vital parts of the body, in the peritoneal cavity, usually to the right of the center of the abdomen, but in rare instances it has been found on the left side, and, still more rarely, otherwise placed.

Until a comparatively recent period the frequent and fatal part played by the vermiform appendix in peritoneal disorders, and especially in septic peritonitis, has not been understood by the medical profession. When it was once proved that the poison which produced septic peritonitis came from the breaking down and consequent perforation or from abscess of the appendix the very root of one of man's worst ailments was laid bare. Further practice established beyond a doubt that in a large majority of cases the appendix could be removed by a single surgical operation and the patient restored to vigorous health if the disease was discovered in time and correctly diagnosed. The surgeons now regard the operation itself as one of the most simple, but to obtain the best results it should take place within a few hours after the patient begins to suffer from the disease.

Appendicitis usually occurs between the ages of 10 and 50 years. It is rare above or below those ages. It is more frequent among males than females, the exact proportion being unknown.

APPENDIX VERMIFORMIS, a worm-like rudimentary process, which hangs from the cæcum or first part of the large intestine. It is from three to six inches in length, the upper end opening into the cæcum and the lower end being closed. It lies in the abdominal cavity just above the right groin and its functions are unknown.

APPENZELL, a canton of Switzerland, in the northeastern part of that country. It is in the midst of beautiful Alpine scenery, and has excellent pasture land, but little agriculture. The Sitter is the chief river. The canton is composed of two half cantons, Ausserrhoden and Innerrhoden. Each has an independent local government. The latter is almost entirely Roman Catholic, while the former is Protestant. The capital of the canton is Trogen with a population of about 2,500. Innerrhoden has a population of about 15,000, and Ausserrhoden about 60,000.

APPERCEPTION, a psychological term denoting the mental act and faculty of writing or relating ideas or other mental states in groups or larger wholes of any part. A particular object or idea is said to be apperceived when it is taken up into an earlier complex mental state and put into appropriate connection with its parts. It goes further than ASSOCIATION OF IDEAS (*q. v.*), since it recognizes the fact that the mind proceeds according to a more or less systematic plan and selects its materials and thus involves constructive imagination; while association deals with a more or less mechanical revival of ideas, according to their accidental contiguities and resemblances.

APPIAN WAY, the great Roman highway constructed by Appius Claudius, from Rome to Capua, and afterward extended to Brundusium, and finished B. C. 312.

APPIUS, CLAUDIUS (ap'ē-us), surnamed Cæcus, or the Blind, an ancient Roman, elected censor B. C. 312, which office he held four years. While in this position he made every effort to weaken the power of the plebs, and constructed the road and aqueduct named after him. He was subsequently twice consul, and once dictator. In his old age he became blind. He is the earliest Roman writer of prose and verse whose name we know.

APPIUS CLAUDIUS CRASSINUS, a Roman decemvir (451 to 449 B. C.). Being passionately in love with Virginia, daughter of Virginius, a respectable plebeian absent with the army, he persuaded M. Claudius, his client, to gain possession of her, under the pretense that she was the daughter of one of his slaves. The people compelled him to set her at liberty; but Claudius summoned her before the tribunal of Appius, who decided that the pretended slave should be given up to her master. A fearful disturbance arose, and the decemvir was compelled to leave Virginia in the hands of her family. Virginius, hurriedly recalled from the army, appeared and claimed his daughter; but, after another mock trial, she was again adjudged to be the property of Marcus Claudius. To save his daughter from dishonor Virginius slew her. The army returned to Rome with Virginius, who had carried the news to them, and the decemviri

were deposed. Appius Claudius died in prison, by his own hand, according to Livy.

APPLE, the fruit of the *pyrus malus*, a species of the genus *pyrus*. All the different kinds of apple trees now in cultivation are usually regarded as mere varieties of the one species which, in its wild state, is known as the crab tree, *pyrus acerba*. The Romans are said to have had 22 varieties of the *pyrus malus*, or cultivated apple tree. At the present time it is, perhaps, the most widely diffused and valuable of all fruit trees. About 1,000 varieties are cultivated in the United States, where the cultivation of the fruit on an extensive scale has become one of the most profitable industries.

The apple is regarded by botanists as the type of the kind of fruit to which they have applied the term *pome*. The eatable part has a more or less aromatic, sweet, or sub-acid taste, and contains starch, grape-sugar, and malic acid. Malic acid, extracted from the apple, has long been used in medicine, and is largely employed as a mordant in dyeing.

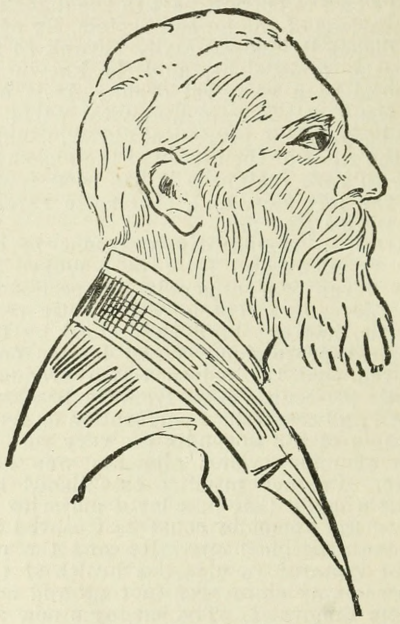
APPLETON, city and county-seat of Outagamie co., Wis., on the Fox river and the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads; 25 miles S. W. of Green Bay. It is at the head of navigation on Lake Winnebago and on the Green Bay waterway, on a plateau 70 feet above the river, and near the Grand Chute rapids, whence it derives excellent power for manufacturing. The principal industries are the manufacture of farm implements, furniture, paper, flour, pulp, machinery, and woolen and knit goods. It is the seat of Lawrence University (Methodist-Episcopal), and has university and public-school libraries, National banks, daily and weekly newspapers. Pop. (1910) 16,773; (1920) 19,561.

APPOGGIATURA, in music, a small additional note of embellishment in preceding the note to which it is attached, and taking away from the principal note a portion of its time.

APPOLD, JOHN GEORGE, an English mechanician and inventor of automatic machinery, born in 1800. He invented a centrifugal pump and a brake which was used in laying the Atlantic cable. He died Aug. 31, 1865.

APPOMATTOX COURT HOUSE, a village in Appomattox co., Va., 20 miles E. of Lynchburg. Here, on April 9, 1865, General Lee surrendered to General Grant, and thus virtually concluded the Civil War.

APPONYI, ALBERT, COUNT, Hungarian statesman, born 1846. He received his education at the universities of Vienna and Budapest. In 1872 he entered Parliament, and by his eloquence and gift of leadership soon became the head of the Conservative National Party. In 1899 he joined the ranks of the Liber-



COUNT ALBERT APPONYI

als; he was chosen President of the Reichstag in 1901 and was speaker of the Chamber from 1902 to 1904. In 1906 he became Minister of Public Education, and held that office till 1910. He visited the United States in 1904 as a delegate to the World's Peace Conference at St. Louis, and again in 1911, when he lectured on international law. He was a pronounced opponent of Count Tisza, for many years perhaps the most sinister figure in Hungarian public life. In 1920 he was head of the Hungarian peace delegation which visited Paris to receive the Allied peace terms.

APPORTIONMENT BILL, a bill adopted by the United States Congress every 10 years, and directly after the completion of the Federal census, which determines the number of members that each State is entitled to send to the National House of Representatives, and provides for the necessary reorganization of the Congressional electoral districts. The apportionment based on enumeration of 1910 provided one representative for every 211,887 of population.

APPRENTICESHIP, in law, a contract by which a person who understands some art, trade, or business, and called master, undertakes to teach the same to another person, commonly a minor, and called the apprentice, who, on his part, is bound to serve the master, during a definite period of time, in such art, trade, or business. At common law, an infant may bind himself apprentice by indenture, because it is for his benefit. But this contract, on account of its liability to abuse, has been regulated by statute in the United States, and is not binding upon the infant unless entered into by him with the consent of the parent or guardian, or by the parent or guardian for him, with his consent. The contract need not specify the particular trade to be taught, but is sufficient if it be a contract to teach such manual occupation or branch of business as shall be found best suited to the genius or capacity of the apprentice. This contract must generally be entered into by indenture or deed. The master must not abuse his authority, either by bad treatment, or by subjecting his apprentice to menial employments unconnected with the business he has to learn; but he may correct him with moderation for negligence and misbehavior. He cannot dismiss his apprentice except by consent of all the parties to the indenture. He cannot remove the apprentice out of the State under the laws of which he was apprenticed, unless such removal is provided for in the contract, or may be implied in its nature; and if he do so remove him, the contract ceases to be obligatory. An infant apprentice is not capable in law of consenting to his own discharge. After the apprenticeship is at an end, the master cannot retain the apprentice on the ground that he has not fulfilled his contract, unless especially authorized by statute. An apprentice is bound to obey his master in all his lawful commands, take care of his property, and promote his interests, endeavor to learn his trade or business, and perform all the covenants in his indenture not contrary to law. He must not leave his master's service during the term of the apprenticeship.

APRICOT, a fruit, that of the *prunus armeniaca;* also the tree on which it grows. It is wild in Africa and in the Caucasus, and also in China and some other countries. It is esteemed only second to the peach.

APRIL, the fourth month of the year. It was called Ooster, or Easter month, by the Anglo-Saxons, and Grass month by the Dutch.

APRON, a platform of plank at the entrance of a dock. The apron in shipbuilding is a piece of curved wood placed behind the lower part of the stem, and above the foremost end of the keel, to strengthen the stem. The apron also formerly was a piece of sheet lead used in covering the vent of a cannon.

APSE, a portion of any building forming a termination or projection semi-circular or polygonal in plan, and having a roof forming externally a semi-dome or semi-cone, or having ridges corresponding to the angles of the polygon; especially such a semi-circular or polygonal recess projecting from the eastern end of the choir or chancel of a church, in which the altar is placed. The apse was developed from the somewhat similar part of the Roman basilicæ, in which the magistrate (*prætor*) sat.

APSIDES, the plural of APSE or APSIS; in astronomy, the two points in the elliptic orbit of a planet where it is at the greatest and the least distance respectively from the body around which it revolves. The moon moving in an elliptic orbit around the earth, which is situated in one of the foci, is at what was anciently called its higher apse when it is in apogee, and at its lower one when it is in perigee. Similarly, the primary planets, including the earth and comets, moving in elliptic orbits around the sun, which is situated in one of the foci, pass through their higher apse when they are in aphelion, and their lower one when in perihelion. It is the same with the satellites of Jupiter when they are in the apojove and perijove.

The line of the apsides is the line connecting the two apsides of a primary or secondary planet. Were it not for a motion of the apsides, it would exactly coincide with the major or longer axis of the ellipse.

The progression of the moon's apsides is a slow movement in the position of the apsides of the moon, produced by the perturbing attraction of other heavenly bodies. It is about three degrees of angular motion, in one revolution of the moon, and in the same direction as her progression in her orbit. The apsides of the primary planets are also, to a certain extent, perturbed.

The revolution of the moon's apsides is the movement of the apsides around the entire circumference of the ellipse, which takes place in 3,232.5753 mean solar days, or about nine years.

A libration in planetary apsides is a movement sometimes forward and sometimes backward in the apsides of Venus

and Mercury, from perturbations caused by other heavenly bodies.

APSLEY STRAIT, a narrow channel between Melville and Bathurst Islands, off the N. coast of Australia. It is about 40 miles in length, with a breadth varying from 2 to 5 miles.

APTERYX, a genus of birds, the typical one of the family *apterygidæ*. Two species are known—the *A. australis* and *A. mantelli*, both from New Zealand. The natives call the former Kiwikiwi, which is an imitation of their peculiar cry. The *A. australis* is somewhat less in size than an ordinary goose. It runs when pursued, shelters itself in holes, and defends itself with its long bill; but unable as it is to fly, it is destined to become extinct.

APULEIUS, LUCIUS (ap-ū-lē'us), a famous Latin satirist and writer of fiction; lived in the 2d century, and was a native of northern Africa. Having inherited an ample fortune, he devoted himself to study and travel; attending first the schools of Carthage, then the Athenian schools of philosophy. His principal work is "Metamorphosis" or "The Golden Ass," which includes the charming epilogue of "Cupid and Psyche"; well known also is his witty "Apology," a defense against a charge of sorcery brought by the sons of a widow twice his age whom he married.

APULIA (ap-ū'lē-a), a region of ancient Italy along the Adriatic. In most ancient times, three distinct nations dwelt here—the Messapians, or Sallentines, the Peucetians and the Dauni, or Apulians. The old Latin traditions speak of Daunus, a King of the Apulians, who was expelled from Illyria, and retired to this part of Italy. According to the tradition which conducts the wandering heroes of the Trojan war to Italy, Diomed settled in Apulia, was supported by Daunus in a war with the Messapians, whom he subdued, and was afterward treacherously killed by his ally. Aufidus, a river of Apulia, has been celebrated by Horace, born at Venusia, in this territory. The second Punic War was carried on in Apulia. Cannæ, famous for the defeat of the Romans, is in this region. The modern department of Apulia consists of three provinces: Bari delle Puglie, Foggia, and Lecce. The chief occupation of its inhabitants is the raising of domestic animals. Chief towns: Bari, Brindisi, Foggia, Lecce. Area, 7,376 square miles; pop. about 2,500,000.

APURE (a-pö'rā), a navigable river of Venezuela, formed by the junction of several streams which rise in the Andes of Colombia; it falls into the Orinoco.

APURIMAC (a-pö-re-mak'), a river of South America, which rises in the Andes of Peru; and being augmented by the Pampes and other streams forms the Ucayale which, after it is joined by the Maranon, forms the Amazon. From it a department of Peru receives its name. Area, 8,187 square miles; pop. about 200,000. Capital, Abancay. It produces coffee, cocoa, rubber and sugar, and has gold and silver mines.

APUS, in zoölogy, a genus of entomostracans, the typical one of the family *apodidæ*. They have the carapace of one piece, and completely enveloping the anterior part of the animal. They have about 60 pairs of feet.

AQUA, a word much used in pharmacy and old chemistry. *Aqua fortis* (=strong water), a weak and impure nitric acid. It has the power of eating into steel and copper, and hence is used by engravers, etchers, etc. *Aqua regia*, or *aqua regalis*, a mixture of nitric and hydrochloric acids with the power of dissolving gold and other noble metals.

AQUAMARINE, a name given to some of the finest varieties of beryl of a sea-green or pale blue color. Varieties of topaz are also so called.

AQUARIUM, an artificial tank, pond, or vessel, filled with salt or fresh water, and used, in the former case chiefly for the purpose of keeping alive marine animals in circumstances which render it easy to study their habits, and in the latter for cultivating aquatic plants.

AQUARIUS, in astronomy, the 11th of the 12 ancient zodiacal constellations, now generally called signs of the Zodiac. It is generally quoted as "Aquarius, the Water-bearer."

AQUATIC ANIMALS, animals living in or about water. It is worth noting that the home of almost all the simpler animals is distinctly and necessarily aquatic. While a few of the protozoa, such as one of the amœbæ, occur in damp places on land, or within other organisms, the vast majority live freely in the water, and the same is true of the sponges, cœlenterates, and echinoderms. Although the great majority of crustaceans are aquatic, a few, such as the wood-louse and land crab, are modified for life ashore. The crowd of insects, spiders, and myriapods are of course terrestrial or aërial, though here also the habits of some adult forms, and the life of some of the young are distinctly aquatic. Among mollusks also there is an equally familiar occurrence of both aquatic and terrestrial habit, while nu-

merous forms illustrate the transition from the former to the latter. The ascidians are exclusively marine. Some fishes have a limited power of life out of the water, the double-breathing dipnoi being in this connection especially instructive. Among many amphibians, the transition from water to *terra firma* is seen in the individual life-history, when the fish-like gilled tadpole becomes the lunged gill-less frog. The instance of the gilled axolotl becoming, in the absence of sufficient water, the gill-less amblystoma, forcibly illustrates the importance of the medium as a factor in evolution. Among reptiles there are numerous aquatic forms—chelonians, lizards, snakes, and crocodiles, though the absence of any gill respiration marks the progressive general adaptation to terrestrial life. While an emphatically terrestrial amphibian like the tree frog seeks a watery hole for the rearing of the young gill-breathing tadpoles, the habit is reversed in such reptiles as the sea turtle, which, having returned to the more primitive aquatic home, yet revisits the land for egg-laying purposes. Among mammals the sea cow, the seal, and the whale are familiar illustrations of very different types which have returned to the primeval watery home and aquatic habit, with consequent change of structure.

In the more thoroughly aquatic animals, which have remained in the primitive environment, and have not merely returned to it, the blood is usually purified by being spread out on feathery gills which catch the oxygen dissolved in the water; while in terrestrial forms which have betaken themselves to an aquatic life, the ordinary direct "air breathing" is still accomplished at the surface of the water, or, in some isolated cases of insects and spiders, by means of the air entangled in their hairs, or even conveyed into their submerged homes. The genuinely aquatic animals are known to have a body temperature not much higher than that of the surrounding medium, and often survive even the freezing of the water; while the higher warm-blooded vertebrates which have returned to the aquatic habit, various modifications, such as thick fur and plumage, waterproof varnish, formation of blubber, serve as protections against the cold.

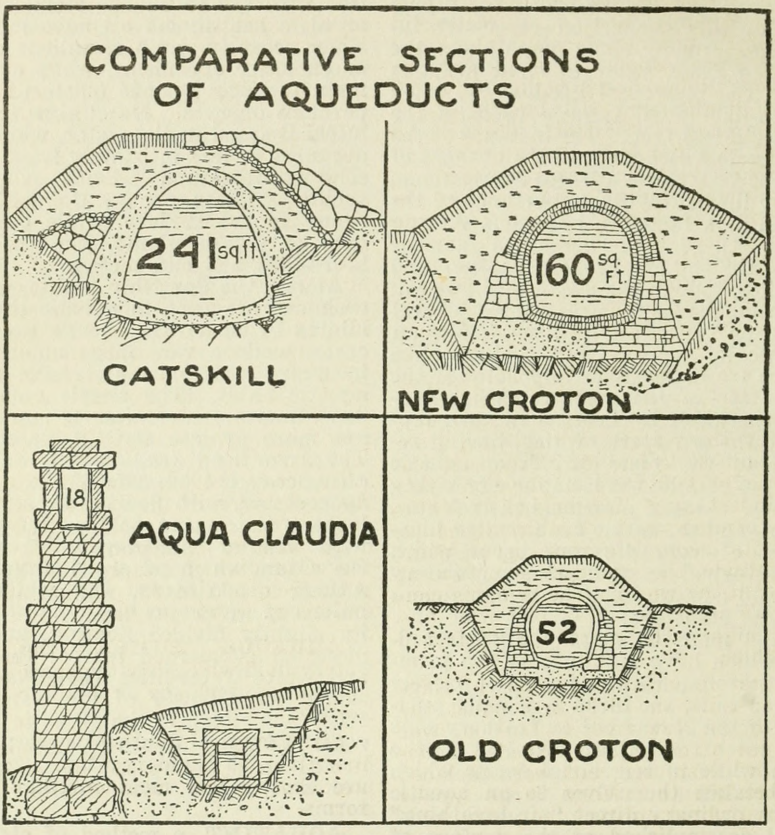
AQUATIC PLANTS, plants growing in or belonging to water. The presence of water is not only essential to the active life of all organisms, but is peculiarly necessary for plants which are for the most part dependent for food supply on matter dissolved in water, as well as on the carbonic anhydride mingled with the surrounding medium. Numerous plants are, moreover, in the strict sense of the word aquatic, having never acquired or having lost all direct connection with the soil. The simplest plants or algæ are almost all aquatic, though many occur in damp situations on land, or on other organisms, while others remain for long periods quiescent in comparative dryness. Many algæ are absolutely isolated in the water, while others are more or less intimately fixed to some solid substratum. Some rhizocarps, such as salvinia, are aquatic, with leaves rising to the surface, while others are land or marsh plants, like the higher horse-tails and club-mosses.

Among the flowering plants, or phanerogams, a return to aquatic life is exhibited by numerous, though exceptional cases, while a very large number grow in moist situations, and have a semi-aquatic habit. The simple monocotyledons, known as *helobieæ*, or marsh lilies, are more or less strictly water-plants. The arrowhead (*sagittaria*), and other *alismaceæ;* the *butomis* of the marshes; *hydrocharis*, with floating kidney-shaped leaves; the water soldier (*stratiotes*), with narrow submerged leaves; and the Canadian pond weed (*anacharis*). Among dicotyledons, the white water buttercup (*ranunculus aquatilis*), with its slightly divided floating, and much dissected submerged leaves; the yellow and white water-lilies (*nymphæa*); the sacred lotus flower of the Ganges and Nile (*nelumbium*); the gigantic *Victoria regia* of tropical South America; and the insectivorous bladderwort or *utricularia*, are among the most familiar aquatic forms.

AQUATINT, a method of etching on copper by which a beautiful effect is produced, resembling a fine drawing in sepia or Indian ink. The special character of the effect is the result of sprinkling finely powdered resin or mastic over the plate, and causing this to adhere by heat, the design being previously etched, or being now traced out. The nitric acid (*aqua fortis*) acts only in the interstices between the particles of resin or mastic, thus giving a slightly granular appearance.

AQUEDUCT, an artificial channel or conduit for the conveyance of water from one place to another; more particularly applied to structures for conveying water from distant sources for the supply of large cities. Works for supplying communities with water must have been constructed at a very early period. In China there are said to be aqueducts dating back to prehistoric times. In Persia and Assyria there are structures

the remains of which indicate that they were used for aqueducts. Recent excavations at Jerusalem have laid bare wells and channels cut in the solid rock,



AQUEDUCTS

and indicate that the water supply of the city was brought from the neighborhood of Bethlehem and Hebron. In Patara, a city of Lycia, in Asia Minor, there is a very ancient aqueduct, consisting of an embankment of rough stone 250 feet high and 200 feet long. The channels for the water consist of cubical stone blocks about a yard in dimension, with a hole 13 inches in diameter, the blocks being closely connected and cemented together. The first Roman aqueduct was the joint work of Appius Claudius Cæcus and Caius Plautius Venox, censors in 312 B. C. Appius Claudius built the conduit, Venox discovered the springs. The entire length of the aqueduct was about 10 miles, and it furnished 115,303 cubic meters a day. The second aqueduct was begun in 272 B. C., by Manius Curius Dentatus, and was finished three years later. Its length was about 45 miles, and it furnished 277,866 cubic meters a day; it was not used for drinking, but for irrigating gardens and flushing drains. In 144 B. C. the Senate determined to repair the old aqueducts and built a new one. This work was begun by Quintus Marcius Rex. The Marcian aqueduct brought the water from 56 miles away in the territory of Arsoli, and fed water to the highest platform of the capitol. It was restored in 33 B. C., and Augustus doubled the supply of water in 5 B. C. The viaducts and bridges by which it crossed the highlands are magnificent. There are seven bridges, some of them carrying four aqueducts. The Marcian reaches Rome at the Porta Maggiore, where no less than 10 water supplies met. Of the nine aqueducts which brought water to ancient Rome, three still supply the modern city, viz., the Aqua Virgo, now Acqua Vergine, finished by Agrippa, 27 B. C., and restored by Pope Nicholas V. in 1453; the Aqua Trajana, now Acqua Paolo; and the Aqua Marcia.

The Romans also constructed important aqueducts for the cities throughout their empire. One of the finest aqueducts in Europe is the Pont du Gard, built in the 3d or 4th century, or possibly by Agrippa, 19 B. C., at Nimes, in southern France. It is still in a good state of preservation. It is higher than any about Rome itself, being fully 180 feet in height, and the length of its highest arcade is 873 feet. There is an aqueduct in Paris built by Julian in 360 A. D.; also a very important aqueduct at Constantinople, built by Hadrian and restored by Theodosius. Since 1885 the water has been furnished the city by an aqueduct built by a French company, taking the supply from Lake Derkos. The ruins of an aqueduct exist at Mayence, and of another near Metz, Alsace-Lorraine.

There are many other important aqueducts. One of the most remarkable is that constructed by Louis XIV., in 1684, to convey the waters of the Eure from Point Gouin to Versailles. Troops to the number of 40,000 were employed in this great undertaking. The bridge at Maintenon, forming part of this aqueduct, even in its incomplete state, is, in point of magnitude, the grandest structure of the kind in the world. The remains consist of 47 arches, each 42 feet wide and 83 feet high. The piers are 25 feet 6 inches thick.

The first important aqueduct in England was built in 1613, to conduct the waters of the New river to London, over a distance of 20 miles. Wooden aqueducts were first used, but were replaced by embankments. Very large works were constructed during nine years, ending in 1877, to bring water from Longdendale, between Sheffield and Manchester, to the latter city. In this instance the aqueducts consist for the most part of tunnel and covered conduit, but for 8 miles the water is conveyed in large cast-iron pipes laid along or under the public roads. Before the Longdendale works were finished, the question of a greater supply had to be considered. This led to the adoption of the scheme for bringing water from Lake Thirlmere in Cumberland to Manchester. The length of the line is nearly 100 miles, and the works were carried out in 1885-1894.

In Scotland, the Loch Katrine aqueduct supplies Glasgow with water coming from a distant of 42 miles. An aqueduct was built in 1738, conducting water for a distance of about 15 miles into the city of Lisbon. The aqueduct of Caserta was built in 1573, by Vanvitelli, by order of Charles III. and his son, for the purpose of supplying the gardens of Caserta with water from Monte Taburno, a distance of 25 miles. It now conducts the water to Naples and crosses 20 valleys; the last 15 miles the water is carried in iron pipes. The Canal de Marseilles, 57 miles in length, conveys water from the River Durance to Marseilles, and is a magnificent specimen of French engineering. The Vienna aqueduct is nearly 60 miles long, and was finished in 1873.

There are a number of important aqueducts in America. For 125 years, the city of Otumba, in Mexico, received its supply of water through the aqueduct of Zempoala, which, however, has not been used since 1700, though the aqueduct is said to be in almost perfect condition. It is 27 miles long. New York is supplied with water from Croton river, which falls into the Hudson above Sing Sing. The first aqueduct was constructed between the years 1837 and 1842, and is 38 miles long. When the conduit reaches the Harlem river, the water is conveyed in iron pipes over a splendid bridge, 150 feet above the river.

In October, 1917, New York celebrated the completion of the vast Catskill Aqueduct. The great Ashokan Reservoir, 12 miles west of Kingston, N. Y., receives the waters which supply New York City with from 500 to 600 million additional gallons of water per day.

AQUEOUS HUMOR, the limpid watery fluid which fills the space between the cornea and the crystalline lens in the eye.

AQUEOUS ROCKS, mechanically formed rocks, composed by matter deposited by water. Called also sedimentary or stratified rocks.

AQUIFOLIACEÆ, a natural order of plants; the holly tribe. The species consist of trees and shrubs, and the order includes the common holly (*ilex aquifolium*) and the *I. paraguayensis*, or Paraguayan tea tree.

AQUILA (ak-wē'la), an episcopal town of Italy, on the Pescara river, near the Apennines, 58 miles N. E. of Rome; is the capital of the province of Aquila, and is strongly fortified. It is noted for its manufactures of wax, linen, paper, and its trade in saffron. The town suffered much injury by earthquakes in 1688, 1703, and 1706. It has a citadel, constructed in 1534. Emperor Frederick II. built Aquila on or in the vicinity of the ancient site of Amiternum, about 1240. Pop. about 25,000.

AQUILEJA (äk-il-ā'yä), **AGLAR**, or **AQUILEIA**, an old town of the former Austrian crownland of Görz and Gra-

disca, 22 miles W. N. W. of Trieste, near the Gulf of Venice. Before the fall of the Roman empire it was the great emporium of trade between the north and south of Europe, and was often called the "Second Rome." Cæsar Augustus frequently resided here, and several councils of the Church, the first in 381, were held here. In the 6th century, the title of Patriarch was taken by the bishops of Aquileja, who assumed second rank to the Pope. The town was destroyed by Attila in 452, when the inhabitants numbered 100,000. Pop. 2,000.

AQUINAS, THOMAS (ak-wī'nas), or **THOMAS OF AQUINO**, the prince of scholastic theologians, was of the family of the Counts of Aquino, and was born



THOMAS AQUINAS

about 1226, in the castle of Rocca Secca, near Aquino, a small town half-way between Rome and Naples. He received the rudiments of his education from the Benedictine monks of Monte Cassino, and completed his studies at the University of Naples. Against the will of his family, he entered (1243) the order of Preaching Friars founded by St. Dominic. In order to frustrate the attempts of his mother to remove him from the convent, he was sent away from Naples, first to Rome and then to Paris; but his brothers took him by force from his conductors, and carried him to the paternal castle. Here he was guarded as a prisoner for two years, when, by the help of the Dominicans, he contrived to escape, and went through France to the Dominican Convent at Cologne, in order to enjoy the instructions of the famous Albertus Magnus. According to another account, he owed his release from confinement to the interference of the Emperor and the Pope. In 1248, being 22 years of age, he was appointed by the general chapter of his order to teach at Cologne, together with his old master, Albert. He now began to publish his first works, commentaries on the ethics and the philosophy of Aristotle. In 1252 he was sent to Paris. It was not, however, till 1257 that Aquinas and his friend St. Bonaventura, the Franciscan, obtained their degrees of doctor, as the University of Paris, under the influence of William de St. Amour, was hostile to the mendicant friars. He vindicated the principles of these orders in an important work; and, in a disputation in presence of the Pope, procured the condemnation of the books of his adversaries. He continued to lecture with great applause in Paris, till Urban IV., in 1261, called him to Italy to teach in Rome, Bologna, and Pisa. It was at this time he composed most of his great works.

Even during his life, Aquinas enjoyed the highest consideration in the Church. Both Urban IV. and his successor, Clement IV., who were much attached to Aquinas, pressed upon him the highest ecclesiastical dignities in vain. He treated Christian morals according to an arrangement of his own, and with a comprehensiveness that procured him the title of the "Father of Moral Philosophy." The definiteness, clearness, and completeness of his method of handling theology were such that his "Summa Theologiæ," which may be said to be the first attempt at a complete theological system, remains to this day substantially the standard authority in the Roman Church. Another important work of Aquinas is his "Summa Contra Gentiles," which deals chiefly with the principles of natural religion. His commentaries on Scripture and devotional treatises also have a high reputation. His influence on the theological thought of succeeding ages was immense. At the Council of Trent, the "Summa" was honored with a place on the table by the side of the Bible. It was at Bologna that he began this his greatest work, by which his name will always be connected, but which he never lived to complete. While at work in Naples, his health broke down, but Gregory X., who had called a general council to effect the union of the Greek and Latin Churches, summoned Aquinas to defend the papal cause at Lyons, where the council was to meet on May 1, 1274. He set out, though suffering from fever, and was surprised by death on the

road at the Cistercian abbey of Fossa-Nuova, March 7, 1274. All Europe mourned his loss. Miracles were said to be wrought at his funeral. Universities, religious orders, and princes contended for the honor of possessing his body. It was finally bestowed by the Pope on Toulouse, where it was received by 150,000 persons, headed by Louis, Duke of Anjou. Aquinas was canonized by John XXII. in 1323, and proclaimed a "Doctor of the Church," by Pius V. in 1567. The first complete edition of Aquinas' works was published in 17 volumes folio, at Rome, in 1570.

AQUITANIA (ak-wē-tā'nē-a) later **AQUITAINE**, a Roman province in Gaul, which comprehended the countries on the coast from the Garonne to the Pyrenees, and from the sea to Toulouse. It was brought into connection with England by the marriage of Henry II. with Eleanor, daughter of the last Duke of Aquitaine.

ARABAH, a deep, rocky valley or depression in northwestern Arabia, between the Dead Sea and Gulf of Akabah, a sort of continuation of the Jordan Valley.

ARABESQUE (ar-a-besk'), a style of ornamentation in which are represented men, animals (the latter consisting of mythic as well as actual forms); plants, with leaves, flowers, and fruit; mathematical figures, etc.; the whole put together in a whimsical way, so that, for instance, the animals not merely rest upon the plants, but grow out of them like blossoms. There are three kinds of arabesque: (1) (and oldest), that of the Romans, without the animals. They occur in the mural paintings at Pompeii, Herculaneum, and other places. (2) That of the Arabs, also without the animals. This is well seen in the Alhambra. (3) The Christian arabesque, with the figures introduced. It appears in illuminated medieval manuscripts and elsewhere.

ARABIA, a vast peninsula in the S. W. of Asia, bounded on the N. by the great Syro-Babylonian plain, N. E. by the Persian Gulf and the Sea of Oman, S. E. by the Indian Ocean, and S. W. by the Red Sea and Gulf of Suez. Its length from N. W. to S. E. is about 1,800 miles, its mean breadth about 600 miles, its area rather over 1,000,000 square miles, its population may be roughly estimated at 10,000,000.

Topography.—It exhibits a central table-land, surrounded by a series of deserts, with numerous scattered oases, while around this is a line of mountains parallel to and approaching the coasts, and with a narrow rim of low grounds (*tehama*) between them and the sea. Rivers proper, there are none. By the ancients the whole peninsula was broadly divided into three great sections—Arabia Petræa (containing the city of Petra), Deserta (desert), and Felix (happy). The first and last of these answer roughly to the modern divisions of the region of Sinai in the N. W., and Yemen in the S. W., while the name Deserta was vaguely given to the rest of the country.

Political Divisions.—The principal divisions are Madian in the N. W.; S. of this, Hejaz, Assir and Yemen, all on the Red Sea, the last named occupying the southwestern part of the peninsula; Hadramaut, on the S. coast; Oman occupying the S. E. angle; El-Hasa and Koveit on the Persian Gulf; El-Hamad (desert of Syria), Nefud and Jebel Shammar in the N.; Nejd, the Central Highlands, which occupies a great part of the interior of the country, while S. of it is the great unexplored Dahkna or Sandy Desert. Previous to the World War Madian belonged to Egypt, the Hejaz, Yemen, Bahr-el-Hasa, Koveit, etc., were more or less under the suzerainty of Turkey. The rest of the country was ruled by independent chiefs—sheikhs, emirs, and imams—while the title of Sultan has been assumed by the chief of the Wahabis in Nejd, the sovereign of Oman (who has a subvention from the Indian Government), and some petty princes in the S. of the peninsula. The chief towns are Mecca, the birthplace of Mohammed; Medina, the place to which he fled from Mecca (A. D. 622) and where he is buried; Mocha, a seaport celebrated for its coffee; Aden, on the S. W. coast, a strongly fortified garrison belonging to Britain; Sana, the capital of Yemen; and Muscat, the capital of Oman, a busy port with a safe anchorage.

Climate and Productions.—The climate of Arabia, in general, is marked by extreme heat and dryness. Aridity and bareness characterize both high and low grounds, and the date palm is often the only representative of vegetable existence. There are districts which, in the course of the year, are hardly refreshed by a single shower of rain. Forests there are few or none. The date palm furnishes the staple article of food; the cereals are wheat, barley, maize, and millet; various sorts of fruit flourish; coffee and many aromatic plants and substances, such as gum arabic, benzoin, mastic, balsam, aloes, myrrh, frankincense, etc., are produced. There are also cultivated in different parts of the penin-

sula, according to the soil and climate, beans, rice, lentils, tobacco, melons, saffron, colocynth, poppies, olives, etc. Sheep, goats, oxen, the horse, the camel, ass and mule supply man's domestic and personal wants. Among wild animals are gazelles, ostriches, the lion, panther, hyena, jackal, etc. Among mineral products are saltpeter, mineral pitch, petroleum, salt, sulphur, and several precious stones, as the carnelian, agate and onyx.

People.—The Arabs, as a race, are of middle stature, of a powerful though slender build, and have a skin of a more or less brownish color; in towns and the uplands often almost white. Their features are well cut, the nose straight, the forehead high. They are naturally active, intelligent and courteous; and their character is marked by temperance. bravery and hospitality. The first religion of the Arabs, a Semitic nature worship, in places like the worship of the stars, was supplanted by the doctrines of Mohammedanism, which succeeded rapidly in establishing itself throughout Arabia. Besides the two principal sects of Islam, the Sunnites and the Shîites, there also exists, in considerable numbers, a third Mohammedan sect, the Wahabis, which arose in the latter half of the 18th century, and for a time possessed great political importance in the peninsula. The mode of the Arabs is either nomadic or settled. The nomadic tribes are termed Bedouins and among them are considered to be the Arabs of the purest blood.

History.—The history of the Arabs previous to Mohammed is obscure. The earliest inhabitants are believed to have been of the Semitic race. Jews in great numbers migrated into Arabia after the destruction of Jerusalem, and, making numerous proselytes, indirectly favored the introduction of the doctrines of Mohammed. With his advent the Arabians uprose and united for the purpose of extending the new creed; and, under the caliphs—the successors of Mohammed—they attained great power, and founded large and powerful kingdoms in three continents (see CALIPHS). On the fall of the caliphate of Bagdad, in 1258, the decline set in, and on the expulsion of the Moors from Spain the foreign rule of the Arabs came to an end. In the 16th century Turkey subjected Hejaz and Yemen, and received the nominal submission of the tribes inhabiting the rest of Arabia. The subjection of Hejaz has continued down to the present day; but Yemen achieved its independence in the 17th century, and maintained it till 1871, when the territory again fell into the hands of the Turks. In 1839 Aden was occupied by the British. Oman early became virtually independent of the caliphs and grew into a well-organized kingdom. In 1507 its capital, Maskat or Muscat, was occupied by the Portuguese, who were not driven out till 1659. The Wahabis appeared toward the end of the 18th century, and took an important part in the political affairs of Arabia, but their progress was interrupted by Mohammed Ali, Pasha of Egypt, and they suffered a complete defeat by Ibrahim Pasha. He extended his power over most of the country, but the events of 1840, in Syria, compelled him to renounce all claims to Arabia. The Hejaz thus again became subject to Turkish sway. Turkey afterward extended its rule not only over Yemen, but also over the district of El-Hasa on the Persian Gulf.

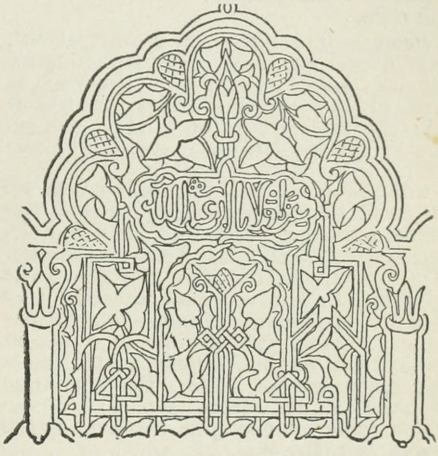
The participation of Arabia in the World War was largely limited to the province of Hejaz, the long strip of territory fronting on the Red Sea, which includes the holy cities of Mecca and Medina. The Shereef of Mecca, Hussein ibn Ali, had an immense influence with the people of Hejaz, because of his prestige as a lineal descendant of Mohammed. Negotiations were opened with him by the British in 1915 to secure his adherence to the side of the Allies, a project that was rendered the easier by the friction that had for some time existed between Hussein and the Turks. The promise of his military co-operation was secured, and in return the Allies promised him the kingship of an Arabic kingdom, which was to be bounded by the Mediterranean, the Red Sea, the Indian Ocean, Persia, and the 37th degree of latitude. In June, 1916, hostilities were begun by Hussein, who defeated the Turks at Mecca, Taif, and Jedda, and opened up communication with the British fleet in the Red Sea, from which he was thereby enabled to receive ammunition and supplies. In Medina, however, the resistance of the Turkish forces was too strong to be overcome at that time. An expedition, co-operating with the British naval forces, was organized against Wejh on the Hejaz coast and proved successful, the city being taken, as were also Dhaba and Moweilah on Feb. 8-9, 1917, thus clearing the northern end of the Red Sea up to Akaba of the enemy. Following this came a period of training and organization of troops by Prince Feisal, the third son of Hussein, and an able and daring commander. Camel corps and cavalry corps were formed, and after the fall of Akaba, Feisal's army became the right wing of the army of Allenby, to whom the Arabs rendered distin-

guished service in his dazzling campaigns that resulted finally in the taking of Jerusalem, the crushing of three Turkish armies, and the capture of Damascus and Aleppo, events which practically brought the war to an end in that quarter of the world.

Apart from the direct military help afforded the Allies, in the desert and Palestinian fighting for which the Arabs were peculiarly fitted, the adhesion of the Hejaz had other advantages quite as important. It practically immobilized two Turkish divisions, who otherwise might have been employed elsewhere, and it broke up the line of communication to Africa, by which the Central Powers were sending emissaries and propaganda to stir up trouble for the French and British in their colonial possessions.

By the terms arrived at a conference between the representatives of the Allied Powers at San Remo, Italy, in May, 1920, Great Britain was given the practical protectorate over Mesopotamia, while France was given the protectorate over the Syrian coast, exclusive of Palestine. Palestine was made a protectorate under Great Britain. The Arabs were greatly discontented with this division of territory, and King Feisal of Hejaz, who had succeeded his father, Hussein, threatened in July, 1920, to begin an aggressive movement to give to the Arabs the practical possession, not only of Syria but of Palestine. See HEJAZ, MESOPOTAMIA, PALESTINE, SYRIA.

Language and Literature.—The Arabic language belongs to the Semitic dialects, among which it is distinguished for its richness, softness, and high degree of development. By the spread of Islam it became the sole written language and the prevailing speech in all southwestern Asia and eastern and northern Africa, and, for a time, in south Spain, in Malta, and in Sicily; and it is still used as a learned and sacred language wherever Islam is spread. The Arabic language is written in an alphabet of its own, which has also been adopted in writing Persian, Hindustani, Turkish, etc. As in all Semitic languages (except the Ethiopic), it is read from right to left. Poetry among the Arabs had a very early development, and before the time of Mohammed poetical contests were held and prizes awarded for the best pieces. The progress of the Arabs in literature, the arts and sciences, may be said to have begun with the government of the caliphs of the family of the Abbassides, A. D. 749, at Bagdad, several of whom, as Haroun al Raschid and Al Mamun, were munificent patrons of learning; and their example was followed by the Ommiades in Spain. In Spain were established numerous academies and schools, which were visited by students from other European countries; and important works were written on geography, history, philosophy, medicine, physics, mathematics, arithmetic, geometry and astronomy. Most of the geography in the Middle Ages is the work of the Arabians, and their historians since the 8th century have been very numerous. Of their philosophical authors the most celebrated are Alfarabi (10th century), Ibn Sina or Avicenna (died A. D. 1037), Alghazzali (died 1111), Ibn Roshd or Averroes (12th century), called by pre-eminence the Commentator, etc. In medicine they excelled all other nations in the Middle Ages, and they are commonly regarded as the earliest experimenters in chemistry. It was by them that algebra (a name of Arabic origin) was introduced to the western peoples, and the Arabic numerals were similarly introduced. Astronomy they especially cultivated, for which famous schools and observatories were erected at Bagdad and Cordova. The tales of fairies, genii, enchanters, and sorcerers in particular, passed from the Arabians to the western nations as in "The Thousand and One Nights."



ARABIAN ORNAMENT

ARABIAN NIGHTS' ENTERTAINMENTS, or "THE THOUSAND AND ONE NIGHTS," a celebrated collection of Oriental tales, which have, since their introduction to the civilized world, become the delight of all who peruse them. This collection, which had long been famous throughout the East, was brought to the notice of Europeans by the translation

of Antoine Galland, a great French Orientalist, in 1704. The best English editions are by Payne and Burton.

ARACACHA, or **ARRACACHA** (ar-a-kä'cha), a genus of umbelliferous plants of South and Central America. The root of *A. esculenta* is divided into several lobes, each of which is about the size of a large carrot. These are boiled like potatoes and largely eaten in South America.

ARACAN (ar-a-kan'), or **ARAKAN**, the most northern division of lower Burma, on the Bay of Bengal; area, 18,540 square miles; pop. about 800,000. It was ceded to the English in 1826, as a result of the first Burmese war.

ARACEÆ (ar-as'ē-ī), an order of endogenous plants having for their inflorescence a spadix placed within a spathe. They have neither calyx nor corolla. The leaves are frequently cordate. The fruit is succulent, with many seeds. They are acrid in character, and often poisonous. The *caladium sequinum*, or dumb cane of the West Indies and South America, when chewed, causes the tongue so to swell as to cause temporary dumbness. There is one species known as the *arum maculatum*.

ARACHIDIC ACID ($C_{20}H_{40}O_2$=$C_{19}H_{39}$:COOH), a monatomic fatty acid, obtained by the saponification of the oil of the earth nut (*arachis hypogæa*). It crystallizes in minute scales, which melt at 75°. It is soluble in boiling alcohol and in ether.

ARACHIS, a genus of leguminous plants belonging to the sub-order *cæsalpiniaceæ*. The A. *hypogæa*, the underground arachis (Greek *hupogeios*=subterranean), is thus called because the legumes are produced and matured beneath the soil. The plant is now cultivated in the warmer parts both of Asia and America. The legumes are eatable. The seeds have a sweet taste and furnish a valuable oil used for lamps and as a substitute for olive oil. In South Carolina they are employed for chocolate.

ARACHNIDA, the class of animals which contains spiders, scorpions, and mites. It is placed between the crustacea on the one hand, and the insecta on the other. The highest crustacea have 10 feet, the arachnida 8, and the insecta 6. The arachnida are wingless, have no antennæ, breathe by means of tracheal tubes or pulmonary sacs performing the function of lungs. As a rule, they have several simple eyes. They have no proper metamorphosis. They live in a predatory manner. Huxley separates the arachnida into six orders: (1) *Arthrogastra*, including scorpio, chelifer, phrynus, phalangium, galeodes, etc.; (2) *araneina*, or spiders; (3) *acarina*, or mites and ticks; (4) fresh-water *arctisca* or *tardigrada*, called water-bears; (5) *pycnogonida* (marine animals); and (6) *pentastomida* (parasites).

ARAD, capital of a district in eastern Hungary; on the right bank of the Maros, an affluent of the Theiss; pop. about 65,000. It is an important railway center, and is 95 miles S. E. of Budapest. It carries on a large trade in corn, spirits, wine and tobacco, and is one of the greatest cattle markets of Hungary. During the 17th century it was often captured, and at last destroyed by the Turks. During the Revolutionary War of 1849 it was occupied for a time by the Austrians, who capitulated to the Hungarians in July. In August Arad was surrendered to the Russians by Görgei. New Arad on the other side of the river, has about 7,500 inhabitants.

ARAFAT, or **JEBEL ER RAHMEH**, a hill in Arabia, about 200 feet high, with stone steps reaching to the summit, 15 miles S. E. of Mecca; one of the principal objects of pilgrimage among Mohammedans, who say that it was the place where Adam first received his wife, Eve, after they had been expelled from Paradise and separated from each other 120 years. A sermon delivered on the mount constitutes the main ceremony of the Hadj or pilgrimage to Mecca, and entitles the hearer to the name and privileges of a Hadji or pilgrim.

ARAGON, once a kingdom, now a captaincy-general of Spain, divided into the three provinces of Saragossa, Huesca, and Teruel; greatest length from N. to S., 190 miles; breadth, 130; area, 18,294 square miles; pop. about 1,000,000. It is bounded on the N. by the Pyrenees, and borders on Navarre, the Castiles, Valencia, and Catalonia. The Ebro flows through Aragon in a S. E. direction, receiving numerous tributaries. Aragon is naturally divided into the level country along the Ebro, and the N. mountainous district of upper Aragon. The central plain is sterile, poorly supplied with water, and intersected by deep ravines. The valleys of upper Aragon are the most fertile of all the Pyrenean valleys. The slopes of the hills are clothed with forests of oak, beech, and pine. The minerals of the province are copper, lead, iron, salt, alum, saltpeter, coal, and amber. The silkworm industry has been

introduced. Aragon early became a Roman province; and, on the fall of the empire, passed into the hands of the West Goths, but was conquered by the Moors in the beginning of the 8th century. The rulers of Aragon, after it had been recovered from the Moors and united with Catalonia (1137) obtained possession of the Balearic Isles in 1213, of Sicily in 1282, of Sardinia in 1326, and of Naples in 1440. By the marriage of Ferdinand of Aragon with Isabella, heiress of Castile, in 1469, the two states of Aragon and Castile were united, and formed the foundation of the later Spanish monarchy. The chief towns are Saragossa, Calatayud, Huesca, and Teruel. Pop. about 120,000.

ARAGONITE, or **ARRAGONITE** (from ARAGON, in Spain, where it was first found), a mineral with orthorhombic crystals, generally six-sided prisms, though the rectangular octohedron is considered its regular form. It occurs also globular, reniform, coralloidal, columnar, stalactitic, and incrusting. Its color is white, gray, yellow, green, or violet; it is transparent or translucent, and brittle. Dana thus divides it: Var. 1. Ordinary: (a) Crystallized in simple or compound crystals, or in radiating groups of acicular crystals; (b) Columnar, including Satin-Spar; (c) Massive. 2. Scaly massive. 3. Stalactitic or Stalagmitic. 4. Coralloidal. 5. Tarnovicite. Mossottite and Oserskite also rank with Aragonite. It occurs in Spain, Austria, Italy, England, America, and elsewhere.

ARAGONITE GROUP, Dana's second group of anhydrous carbonates, comprising aragonite, manganocalcite, witherite, bromlite, strontianite, and cerussite.

ARAGUAY (ar'a-gay), or **ARAGUAYA**, or **RIO GRANDE**, a large river of Brazil, which rises in about 19° S. lat., near the Parana, flowing to about 6° S. lat., where it joins the Tocantins. The united stream, after a course of about 1,300 miles, falls into the delta of the Amazon in S. lat. 1° 40′.

ARAKAN YOMA MOUNTAINS, a range of 700 miles long, stretching from the mountains of the Naga City downward along the E. of Chittagong division, Bengal, and Arakan division, Lower Burma, and through the Irawadi division, and terminating in Cape Negrais; highest peak, Blue Mountain, 7,100 feet.

ARAL LAKE (ä'ral), separated by the plateau of Ust-Urt from the Caspian Sea, is the largest lake in the steppes of Asia. It lies wholly within the limits of Russian Central Asia, embracing an area of about 25,000 square miles. It is fed by the Sir-Darya (the ancient Jaxartes) on the N. E. side and the Amu-Darya (or ancient Oxus) on the S. E. It has no outlet, and is generally shallow, its only deep water being on the W. coast, where it reaches a depth of 225 feet; but it shoals gradually eastward to a mere marshy swamp. Fish, including sturgeon, carp, and herring, are abundant, though the water is brackish. The lake is dotted with multitudes of islands and islets. Owing to the shallowness of its waters, and its frequent exposure to fierce and sudden storms, navigation is difficult. The area it now occupies has been dry land twice within historical times. This was the case during the Græco-Roman period, and again during the 13th and 14th centuries.

ARALIA, a genus of plants, the typical one of the order *araliaceæ*. *A. umbellifera* exudes an aromatic gum. *A. nudicaulis* is used as a substitute for sarsaparilla. The berries of *A. spinosa*, the angelica tree, prickly ash, or toothache tree, of America, infused in wine or spirits, are used in cases of colic, while a tincture of them is prescribed in toothache. *A. racemosa*, the spikenard of America, is also regarded as a medicinal plant.

ARAMÆAN (ar-am-ā'an), or **ARAMAIC**, a Semitic language nearly allied to the Hebrew and Phœnician, anciently spoken in Syria and Palestine and eastward to the Euphrates and Tigris, being the official language of this region under the Persian domination. In Palestine it supplanted Hebrew, and was the tongue of the Jews in the time of Christ. Parts of Daniel and Ezra are written in Aramaic, or, as this form of it is often incorrectly named, Chaldee. An important Aramaic dialect is the Syriac, in which there is an extensive Christian literature.

ARANJUEZ (ar-an-hū'āth), (probably the Latin *Ara Jovis*), a town of Spain, on the left bank of the Tagus, 30 miles S. S. E. of Madrid by rail, in a beautifully wooded valley. The palace was long a favorite spring resort of the royal family. The famous gardens were laid out by Philip II. At Aranjuez was concluded a treaty between France and Spain in 1772, and it was also the scene of the abdication of Charles IV. in 1808. Pop. about 15,000.

ARANY, JÁNOS (or'ony), a Hungarian poet, born at Nagy-Szalonta, March 1, 1817. He was called to Budapest in 1860 as director of the Kisfaludy Society; founded the literary weekly "Kos-

zorl" ("The Wreath"); and in 1865 was appointed secretary of the Hungarian Academy, of which he had been a member since 1859. Owing to his feeble health he resigned in 1878. As a national poet he ranks immediately after Petöfi and Vörösmarty, his epical creations deserving to be acknowledged as ornaments not only of Hungarian but of modern poetry in general. He is master of the ballad and a translator of highest merit, as proven by his versions of Tasso, Goethe, Shakespeare, and, above all, his translation of Aristophanes. He died in Budapest, Oct. 22, 1882.

ARAPAIMA (ar-ap-ā'ma), a genus of tropical fishes, including the largest known fresh water forms. They are found in the rivers of South America, and are sometimes taken in the Rio Negro, 15 feet in length, and 400 pounds in weight. They are shot with arrows or harpooned, and are highly esteemed as food; salted, they are conveyed in large quantities to Para. The genus *arapaima* belongs to the family *osteoglossidæ*, allied to the *clupeidæ* or herring, and is remarkable for the mosaic work of strong bony scales with which the body is covered. The head is also protected by bony armature. *Osteoglossum* and *heterotis* are closely related genera, found in various parts of the tropics.

ARARAT, MOUNT, a famous mountain of Asia, in Armenia, on the confines of the Russian, Turkish, and Persian empires. Its base is washed by the Araxes, from whose low plain it rises to an immense height, terminating in two conical peaks, one much higher than the other. The chief summit, Great-Ararat, was climbed in 1830 by Prof. Parrot, who determined its altitude to be 17,230 feet above sea level. The whole of the upper region of the mountain, from the height of 12,750 feet, is covered with perpetual snow and ice. Ararat is said to be the Ararat of Scripture on whose summit the ark rested.

ARAS, a river of Armenia, rising S. of Erzerum at the foot of the Bingoldagh; it flows for some miles through Turkish territory N. E. to the new Russian frontier. Here it turns eastward to the Erivian plain N. of Ararat, whence it sweeps in a semi-circle mostly between the Russian and Persian territories round to its confluence with the Kur, 60 miles from its mouth in the Caspian; length, 500 miles.

ARAUCANIA (ar-ō-ka'nē-a), the country of the Araucos or Araucanian Indians, in the south of Chile. The Chilean province of Arauco, lying between the Andes and the Pacific Ocean, and bounded on the N. by Concepcion, on the S. by Valdivia, formed in 1875, has an area of 2,189 square miles, and a population (1917) of 73,260. The Araucanians are interesting as furnishing the only example of Indian self-government in the presence of the European races. They are a fierce and warlike people, and have a kind of military aristocratic constitution. Formerly the government rested in the hands of four chiefs (*Toquis*), each nominated by one of the four divisions of the people, and one of whom was elected "great Toqui." They have no formal laws, but custom and tradition have all the force of these. They now number about 70,000. From the days of Pizarro and Almagro downward, Araucania has fought for its freedom—its wars of independence having lasted, with intervals of precarious truce, from 1537 to 1773. In 1861 a French adventurer, Tonneins by name, ingratiating himself with the Indians, was elected King of Araucania. He was soon at war with Chile, and was captured and allowed to go to France. Returning to Araucania, he kept up a struggle with the Chileans in 1869-1870, but repaired once more to France in 1871. In 1870 the Auracanians acknowledged the rule of Chile.

ARAUCARIA (ar-ō-kā'rē-a), a genus of plants belonging to the order *pinaceæ* (conifers) and to the family or section *abietinæ*. Five or six species are known; all from the Southern Hemisphere. The one so common in English gardens is *A. imbricata*, a native of the mountainous parts of southern Chile. Another species, *A. excelsa*, or Norfolk Island pine, is a splendid tree of giant size. All the genus are ornamental from their fine and unfading foliage.

ARBELA, now **ERBIL**, or **ARBIL**, a small town of Assyria, E. from Mosul, famous as having given name to the battle in which Alexander finally defeated Darius, 331 B. C. The battle was really fought near Gaugamela (the "camel's house"), about 70 miles to the N. W. of Arbela.

ARBITRATION, an adjudication by private persons, called arbitrators, appointed to decide a matter or matters in controversy, either by written or oral submission, by agreement of the disputants. It differs from a reference which is made by the order of a court of law.

Legal Arbitration.—Infants and others not *sui juris* cannot submit controversies to arbitration. The matters that may be submitted to an arbitrator are all personal disputes and differences that

might otherwise be made the subject of controversy in the courts of civil jurisdiction, except matters respecting a claim to an estate in real property, in fee or for life, which in New York cannot be submitted to arbitration; in some other States they may be. Thus breaches of contract generally, breaches of promise of marriage, trespass, assaults, charges of slander, differences respecting partnership transactions or the purchase price of a piece of personal property, all may be referred to arbitration. Questions relating to real property in the State of New York cannot be the subject of arbitration. Differences between landlord and tenant, where no claim of title is interposed, may be. Pure questions of law may also be referred to the decision of an arbitrator. Actions at law and suits in equity may also be settled by arbitration; and this kind of reference may be made at any stage of the proceedings, sometimes even after the verdict, and probably, by analogy, after decree in equity. Questions relating to the future use and enjoyment of property, and future or anticipated differences between parties, may likewise be so submitted, but not in New York. In some of the States, however, some matters depending on points strictly technical are excluded from arbitration, in view of the fact that often arbitrators are not learned in the law. A matter clearly illegal cannot be made the subject of a valid submission. Partners and corporations may make submission to arbitration. The arbitrator ought to be a person who stands perfectly indifferent between the disputants; but there are no other particular qualifications for the office, and the choice by parties of the person who they agree shall decide between them is perfectly safe.

Mode of Procedure.—The proceedings before an arbitrator are regulated generally according to the forms observed in courts of law. The arbitrator on the day appointed hears the case and makes his award, which need not be in writing, for a verbal award is perfectly valid; but in practice it is usual for the arbitrator to make a written award. This award in its effect operates as a final and conclusive judgment respecting all the matter submitted, and binds the rights of the parties for all time. An award may be set aside on the ground of corruption and fraud in the arbitrator, and for any material irregularity or illegality appearing on the face of the proceedings, such as is beyond or not covered by the submission. But the tendency of the courts is to favor arbitration, and maintain awards, unless such serious grounds as are above referred to, can be substantiated. Where there are two arbitrators the submission often provides that in the case of their differing in opinion the matter referred shall be decided by a third person, called an umpire, who is generally appointed under a power to that effect by the arbitrators themselves. But they cannot make such appointment unless specially authorized so to do by the terms of the submission. This umpire rehears the case, and for this purpose is invested with the same powers as those possessed by the arbitrators, and is bound by the same rules.

Court of Arbitration.—By chapter 278, Laws of 1874, the legislature of New York established the "Court of Arbitration of the Chamber of Commerce of the State of New York," defined its jurisdiction, and regulated its proceedings. The London Corporation and the London Chamber of Commerce founded jointly in 1892 a Chamber of Arbitration, or Tribunal of Commerce, for settling trade and commercial difficulties; and the great coal dispute and strike of 1893 led to a conference which secured a peaceful conclusion for the time, and the foundation of a permanent "Board of Reconciliation," consisting of representatives both of owners and of the miners. Diplomatic conferences, which often obviate war, belong to a different category.

International Arbitration.—As civilization has progressed, chiefly through vast improvement in transportation, which by mixing up the peoples of the world has made life an infinitely more complex thing, the world has continually sought to find some means for the settlement of international disputes which should avert the horrors and vast economic expense of war. The history of arbitration during the past half century furnishes at least an interesting commentary on the efforts on the part of civilized nations to keep the peace.

The word is defined as "an arrangement for taking and abiding by the judgment of a selected person (or persons) in some disputed matter, instead of carrying it to the established courts of justice." Arbitration as the simplest means of settling a dispute is as old as the first civilized state of man. It was employed by the Romans and its use among modern nations is derived primarily from them.

The Arbitration Act of 1889 in England sums up the English law to date and that of the United States is very much like it. According to such codifications the primary condition is the agreement

of both parties to accept the award of an independent tribunal. Such a court may be special or general, temporary or permanent, open or restricted. In the gravest cases the tribunal works under a special treaty—in the case of the United States, made by the Senate. Financial claims of a private nature are based usually upon executive agreements. The Hague Convention of 1899 introduced a provision "that in case of questions in dispute affecting neither the vital interest nor the honor of the nations involved international commissions of inquiry shall be appointed to examine and report upon the local circumstances"—such reports to serve "either as the basis of diplomatic settlement or of formal arbitration."

A commission of this character was appointed in 1904 in the dispute between Great Britain and Russia on the firing upon British fishing vessels in the North Sea by the Russian fleet, and its findings were accepted as final.

The powers of such commissions were extended through a proposal of the Secretary of State of the United States in the year 1913, to all international questions; war not to be declared in any event pending a decision.

Arbitration, which is the flower of civilization, can only be utilized by civilized countries. It was freely employed among the Greeks in questions of boundaries, commerce, and even religion. The foreign policy of Rome pointing to universal dominion forbade arbitration, but during the Middle Ages it again came into use, under the authority of the Church. The popes and other high dignitaries of the Roman Church became natural arbitrators in cases of private interest and internal policy, and were often called upon. Pope Alexander VI., acting in such a capacity, traced "an imaginary line from pole to pole in his decision of all lands, discovered in the New World, between Spain and Portugal." Pope Clement XI. was umpire in the treaty of Ryswick between Louis XIV. and Leopold I. Arbitration naturally declined with the Reformation, and the establishment of absolute temporal kingdoms. The great progress of civilization with the new area of scientific discovery, especially the invention of steam transportation that brought all nations into such close relation, brought about a return to arbitration methods. There were more than 130 courts of arbitration for grave international questions and as many more for financial claims in operation during the 19th century.

The United States and Great Britain have been foremost among the nations in showing the world the way.

Most important among these was the Treaty of Washington, constituting a Joint High Commission, which, sitting at Geneva in 1871, settled the "Alabama" claims. The frequent disputes between the Latin-American States during the past half century have been for the most part peacefully determined by arbitration.

During the last century and a quarter the United States has figured largely in this field of diplomacy.

The Jay Treaty of 1794, negotiated by John Jay, as chief representative of American interests, with Great Britain, called for one commission to settle the identity of the St. Croix river on the northeastern boundary; for another to determine between certain of the States and British creditors whose debts had been repudiated or dishonored in violation of the treaty; and a third to settle the rights of neutrals, questions of contraband, and the penalty of the decisions of prize courts.

The Treaty of Ghent in 1814 between the United States and Great Britain likewise provided for three commissions, all relating to boundary questions along the Canadian border, and the right to certain islands in Passamaquoddy Bay and the Bay of Fundy.

The next important question culminated in the year 1818, and required Great Britain on the part of this country to restore slaves in the British possessions at the signing of the Treaty of Ghent. The Czar of Russia, who was chosen as arbitrator, decided in our favor, and a sum aggregating about a million and a quarter dollars was finally paid.

In the arbitration between this country and Great Britain in 1827 for the settlement of the northeastern boundary, the King of the Netherlands as arbitrator failed to provide a settlement, and the matter was finally compromised in the Webster-Ashburton treaty. Important matters with France were settled in 1831 including claims for private depredations at sea during the Napoleonic wars, the French Beaumarchais claim, and claims for special commercial privileges under the Louisiana cession treaty—in all amounting to an indemnity of more than five and one half millions. The right to take fish in Canadian waters adjoining unsettled territory again came up in 1855 between the United States and Great Britain, and was only finally settled in 1866.

The Treaty of Washington between the United States and Great Britain, in 1871,

took up the San Juan water boundary, decided in favor of this country by the Emperor of Germany; the Nova Scotia fisheries question; all Civil War claims outside of the "Alabama" claims; and finally the "Alabama" claims. In the Nova Scotia fisheries dispute Great Britain was awarded £1,100,000 and in the third case £386,000. The Samoan dispute involving Great Britain, Germany, and the United States, was attacked in 1889 by the establishment of a joint commission appointed by the King of Sweden in co-operation with the Chief Justice of Samoa. Complications arising ten years later, a joint high commission visited Samoa, and an agreement for the partition of the islands was signed Dec. 2, 1899.

The Behring Sea fisheries dispute between Great Britain and the United States was finally settled in 1896, the first commission having been established in 1892. The first award, mainly in favor of Great Britain, was rendered in 1893, but recognized the plea of the United States for the regulation of the seal fisheries and its proposals to that end. A second commission appointed in 1896 fixed the amount of damages due to Canadian sealers under the former decision at $471,151.

The next important question was the determination of the Alaskan boundary, which began in 1897, and was finally settled in 1899.

Sealing disputes with Russia, arising out of the seizure of four American sealfishers by a Russian cruiser in Bering Sea in 1891, were finally settled by arbitration in 1902, the decision being in favor of the United States with the enunciation of the principle that a war vessel has no jurisdiction over a vessel of another nation outside territorial waters. The Alaska boundary dispute was finally settled by a joint commission representing Great Britain and the United States in 1903. See PEACE MOVEMENT; LEAGUE OF NATIONS.

ARBOR DAY, a day set apart to encourage the voluntary planting of trees by the people. The custom was inaugurated by the Nebraska State Board of Agriculture in 1874, which recommended that the second Wednesday in April annually be designated as Arbor Day, and that all public school children should be urged to observe it by setting out young trees. The custom has since been extended, till now nearly every State and Territory in the country has set apart one day by legislative enactment, or otherwise, for this purpose. The ceremony usually consists of planting shade or ornamental trees on the grounds of public or other school buildings. In Canada the first Friday in May is celebrated as Arbor Day.

ARBORICULTURE. See FORESTRY.

ARBOR VITÆ, literally the tree of life. (1) In botany, a name given to the trees belonging to the coniferous genus thuja. *T. occidentalis*, or American arbor vitæ, is a well known and valued evergreen. (2) In anatomy, a dendriform arrangement which appears in the medulla of the brain when the cerebellum is cut through vertically.

ARBUTUS, a genus of plants belonging to the order of *ericaceæ* (heath worts). A species, the *A. unedo*, or austere strawberry tree, is found, apparently wild, in the neighborhood of the Lakes of Killarney. It has panicles of large, pale greenish-white flowers and red fruit, which, with the evergreen leaves, are especially beautiful in the months of October and November. Trailing arbutus is a creeping or trailing plant (*epigæa repens*) with rose-colored blossoms, found chiefly in New England in the spring. Commonly called May flower, or sometimes ground laurel.

ARC, in geometry, a portion of the circumference of a circle, cut off by two lines which meet or intersect it. Its magnitude is stated in degrees, minutes, and seconds, which are equal to those of the angle which it subtends. Hence, counted by degrees, minutes, and seconds, the arc of elevation and the angle of elevation of a heavenly body are the same, and the two terms may be used in most cases indifferently. The straight line uniting the two extremities of an arc is called its chord. Equal arcs must come from circles of equal magnitude, and each must contain the same number of degrees, minutes, and seconds as the others. Similar arcs must also each have the same number of degrees, minutes, and seconds, but they belong to circles of unequal magnitude. Concentric arcs are arcs having the same center.

In mathematical geography, an arc of the earth's meridian, or a meridional arc, is an arc partly measured on the surface of the earth from N. to S., partly calculated by trigonometry. Such arcs have been measured in Lapland; in Peru; from Dunkirk, in France, to Barcelona, in Spain; at the Cape of Good Hope, and from Shanklin Down, in the Isle of Wight, to Balta, in Shetland. It was by these measurements that the earth was discovered to be an oblate spheroid.

In electricity, a voltaic arc is a luminous arc, which extends from one pencil of charcoal to another when these are

fixed to the terminals of a battery in such a position that their extremities are one-tenth of an inch apart.

ARC, JOAN OF. See JOAN OF ARC.

ARCA, a genus of conchiferous mollusks, the typical one of the family *arcadæ*. The shell is strongly ribbed, or cancellated, hinge straight, with very numerous transverse teeth. They are universally distributed, but are commonest in warm seas. They inhabit the zone from low water to 230 fathoms. Of the recent species. *A. noæ, A. tetragona, A. lactea, A. raridentata,* and *A. barbata* occur in England. The fossil species are found in the United States, Europe, and southern India.

ARCACHON (ar-ka-shôn'), a bathing place which has grown up since 1854, on the S. side of the Bassin d'Arcachon, 34 miles S. W. of Bordeaux, France. Its main street stretches 2½ miles along the shore, with the pine forest immediately behind. Its numerous villas among the first are much frequented in winter by invalids afflicted with lung disease. Scientific oyster culture is practiced here on a large scale. Pop. about 12,000.

ARCADE, a series of arches of any form, supported on pillars, either inclosing a space before a wall, or any building which is covered in and paved; or, when used as an architectural feature for ornamenting the towers and walls of churches entirely closed up with masonry. The term is also applied to a covered passage having shops on either side of it. Two arcades inscribed in a greater arcade are called geminous arcades.

ARCADIA, the classical name of middle Peloponnesus, now forming the modern province of Arkadia, in the Morea, Greece. It occupies a high tableland having on the N., Achaia, E., Argolis, W., Elis, and, on the S., Laconia and Messenia. Area 1,600 square miles. It is intersected by mountain ranges, some of which are very lofty, and contains plains of some extent. Its principal river is the Roufia (*Alpheus*), the largest in the Morea. Lake Stymphalus, of classic mention, is found here. The inhabitants still retain their primitive mode of life as shepherds, pursuing a migratory existence. Chief towns, Tripolitza, Londari, Karitena, etc. Many interesting ruins are seen here, among them the remains of the cities of Phigaleia, Megalopolis, and Pallantium. Pop. about 175,000. From its first inhabitants, the Pelasgi, the land derived the name Pelasgia. In later times it was divided among the 50 sons of Lycaon into kingdoms, and received from Arcas the name Arcadia. In the course of time the small kingdoms made themselves free, and formed a confederacy. The principal were Mantinea, where Epaminondas obtained a victory and a tomb (now the village of Mondi), Tega (now Tripolitza), Orchomenus, Phenus, Psophis, and Megalopolis. Their chief deity was Pan; their chief business, the breeding of cattle and agriculture. This occasioned the pastoral poets to select Arcadia for the theater of their fables.

ARCESILAUS (ar-ses-ē-lā'us), a Greek philosopher, founder of the New Academy, was born at Pitane in Æolia, Asia Minor, 316 B. C. He ultimately became the head of the academic school or those who held the doctrines of Plato; but he introduced so many innovations that its philosophic character was completely changed in the direction of scepticism. His great rivals were the Stoics. He denied the Stoical doctrine of knowledge, which he affirmed to be, from its very nature, unintelligible and contradictory. He also denied the existence of any sufficient criterion of truth, such as the "irresistible conviction" of the Stoics, and recommended abstinence from all dogmatic judgments. He died in 241 B. C.

ARCH, in architecture, a series of wedge-shaped stones or bricks, so arranged over a door or window in an edifice for habitation, or between the piers of a bridge, as to support each other, and even bear a great superincumbent weight. The stones and bricks of a truncated wedge shape used in building arches are called voussoirs. The sides of an arch are called its haunches or flanks. The highest part of the arch is called its crown, or by the old English authors the scheme or skeen, from the Italian schiena. The lowest voussoirs of an arch are called springers, and the central one which holds the rest together the keystone. The under or concave side of the voussoirs is called the intrados, and the outer or convex one the extrados of the arch. A chord to the arch at its lower part is called its span, and a line drawn at right angles to this chord, and extending upward to its summit, is called its height. The impost of an arch is the portion of the pier or abutment from which the arch springs. If the height of the crown of an arch above the level of its impost is greater than half the span of the arch, the arch is said to be surmounted. If, on the contrary, it is less, then the arch is said to be surbased. The curved arch was known to the Assyrians and the Old Egyptians.

The arch was brought into extensive use by the Romans, and everywhere prevailed till the 12th century A. D. when the arch pointed at the apex, and called in consequence the pointed arch—the one so frequently seen in Gothic architecture —appeared in Europe as its rival. The forms of both curved and pointed arches may be varied indefinitely. Of the former may be mentioned the horseshoe arch, and the foil arch, from Latin *folium*=a leaf, of which there are the trefoil, the cinquefoil, and the multifoil varieties, so named from the plants after which they are modeled.

Other arches are the pointed one; the equilateral one, the drop arch, lancet arch, etc.

ARCHÆAN (ar-kē'an) **ROCKS**, the oldest rocks of the earth's crust, crystalline in character, and embracing granite, syenite, gneiss, mica-schist, etc., all devoid of fossil remains. These rocks underlie and are distinctly separate from the stratified and fossiliferous formations, which indeed have chiefly taken origin from them.

ARCHÆOLOGICAL INSTITUTE OF AMERICA, a society founded in Boston in 1879 for archæological research. It has about twenty affiliated societies with headquarters in different cities. It has founded several schools for classical studies, including those in Athens, Rome, Palestine, and the United States. The society has carried on many important researches in European countries and in various parts of the United States and Central America. It has about 2,000 members.

ARCHÆOLOGY, the science which makes us acquainted with the antiquities of nations that have lived and died, and the remains of various kinds which throw a light upon the history of those now existing. The archæologist seeks to study and preserve any materials which tend to elucidate the objects already mentioned, and these materials naturally resolve themselves into three great divisions, each susceptible of further subdivision. The first class may be considered to consist of all records, written or printed, legal documents, old chronicles, diaries of a public or private nature, state papers, letters, etc. The second may be termed oral, or traditional, in contradistinction to the first, which may be broadly called written archæology, and consists of the ballads, legends, and folk-lore of a people, their sports, superstitions, and the rise and origin of local customs, proverbs, and expressions. The third, termed monumental archæology, consists of works of art, paintings, sculpture, coins, medals, pottery, glass, wooden and metal utensils, tools of all descriptions, armor, weapons, carriages, boats, roads, canals, walls, encampments, burial-grounds, earthen mounds for purposes of defense or sepulture, and even human and animal remains.

ARCHANGEL, a government of Russia in Europe, occupying the entire country from the Ural Mountains on the E. to Finland on the W., and from the Vologda and Olonetz on the S. to the Arctic Ocean and White Sea on the N. Nova Zembla, and some large islands of the Arctic Sea are also included within it; area 331,640 square miles. The largest part of this great territory is bleak, sandy, and perpetually sterile. The principal source of wealth lies in the forests, which are almost inexhaustible. Hunting and fishing are the principal occupations of the inhabitants. The reindeer, among the Laps in the N. W., and the Samoyedes in the N. E., is domesticated. Chief productions are hay, hemp, cordage, mats, tallow, tar, turpentine, potash, etc. The natives, though of Finnish origin, have now become essentially Russian. The Samoyedes, who are in the lowest scale of civilization, and spread over a vast tract of country, do not exceed in number 7,000; the Laps, not more than 2,000. The chief towns are Archangel, the capital, Onega, and Dwina. Pop. about 510,000.

ARCHANGEL, or **ST. MICHAEL**, capital of the province of the same name, and the principal city and seaport of northern Russia, lies on the Dwina, about 34 miles from its fall into the White Sea. During the European War (1914-1918) it became the chief port of Russia. There is a government dockyard, and numerous private shipbuilding concerns. The entrance to the Dwina, on which Archangel was subsequently built, was discovered by Richard Chancellour, an Englishman, in 1554. Pop. about 36,000.

An American force was landed in this city in the latter part of 1918, in conjunction with British, Japanese, and French forces. They were maintained there for many months for the ostensible purpose of guarding supplies which had been placed there for the former Russian Government. Important military operations were carried on around Archangel in the early months of 1919. The Bolshevist forces attacked the city, and the Russian troops under Admiral Kolchak were obliged to withdraw. American forces took no active part in these operations and they were withdrawn in

June, 1919. For an account of the military operations in and around Archangel, see RUSSIA.

ARCHBALD, a borough in Pennsylvania, in Lackawanna co., on the Delaware and Hudson and on the New York, Ontario, and Western railroads. It is about 10 miles N. E. of Scranton, in the midst of a coal-mining region and there are other industries, including silk mills. Pop. (1910) 7,194; (1920) 8,603.

ARCHBISHOP, a chief bishop. The first-formed Christian churches soon became surrounded by younger and less powerful congregations. The pastors of these new churches being called bishops, that term no longer appeared a dignified enough appellation for the spiritual chief of the mother church, and about A. D. 340, the Greek title of *archiepiscopos* was introduced to meet the difficulty, and in subsequent centuries the designation became common over Christendom.

In England the early British churches were, in large measure, swept away by the Anglo-Saxon invaders, who were heathens, and the country consequently required to be reconverted. The great southern center from which this was done was Canterbury, then the capital of Kent, where King Egbert gave Augustine, the chief missionary, a settlement. In the N., York, the chief town of Northumbria, where King Edwin built a shrine for Paulinus, became the great focus of operation for that part of England; hence the two archbishoprics now existing are those of Canterbury and of York. The prelate who occupies the former see is Primate of all England, while his brother of York, is only Primate of England. The former is the first in dignity after the princes of the blood; the latter is not second, but third, the Lord Chancellor taking precedence of him in official rank. An archbishop is often called a metropolitan. In the United States the Roman Catholic Church is the only one which has dignitaries of this rank.

ARCHBOLD, JOHN DUSTIN, an American capitalist, born in Leesburg, O., in 1848. His boyhood and youth was spent in mercantile employment. He removed with his family to Titusville, Pa., where he became identified with an oil company which largely through his efforts became one of the chief rivals of the South Improvement Company, which later developed into the Standard Oil Company. John D. Rockefeller, becoming impressed with Archbold's ability, secured his services. From that time until his death he was active in the Standard Oil Co., rising to be its head. He was one of the trustees of Syracuse University and gave large sums to that institution during his life. At his death he bequeathed to it $500,000. He died December 16, 1916, leaving a fortune of over $25,000,000.

ARCHDEACON, an ecclesiastical dignitary next in rank below a bishop, who has jurisdiction either over a part of or over the whole diocese. He is usually appointed by the bishop, under whom he performs various duties and he holds a court which decides cases subject to an appeal to the bishop.

ARCHDUKE, a duke whose authority and power is superior to that of other dukes. In France, in the reign of Dagobert, there was an Archduke of Austrasia; and at a later period, the provinces of Brabant and Lorraine were termed archduchies. The Dukes of Austria assumed the title of archduke in 1156; but the dignity was not confirmed till 1453. The last to assume the title were the princes of the former imperial House of Austria.

ARCHELAUS (ar-kel'ā-us), a king of Macedon, natural son and successor of Perdiccas II. He was a liberal patron of literature and the arts, and greatly favored, among others, Euripides and Zeuxis. He died about 398 B. C.

ARCHELAUS, son of Herod the Great. His reign is described as most tyrannical and bloody. The people at length accused him before Augustus. The Emperor banished him to Vienne, in Gaul. To avoid the fury of this monster, 7 A. D., Joseph and Mary retired to Nazareth.

ARCHELAUS, the son of Apollonius, a sculptor. He was a native of Ionia. He executed in marble the apotheosis of Homer, which was found, in 1568, at a place called Fratocchia, belonging to the House of Colonna.

ARCHER, WILLIAM, a Scottish critic, born at Perth, Sept. 23, 1856. He graduated at Edinburgh University, 1876, and was called to the bar, 1883. He was for a long time dramatic critic for various London papers, and published books on the drama, including "English Dramatists of To-day" (1882); "Masks or Faces: a Study in the Psychology of Acting" (1888); "Henry Irving," a critical study (1883); "William Charles Macready, a Biography" (1890); "Through Afro-America" (1910); "Play Making" (1912); "The Correct Analysis (1913); etc. He was the English translator of Ibsen's dramas.

ARCHER FISH, the *toxotes aculator*, which shoots water at its prey. It is found in the East Indian and Polynesian Seas.

ARCHERY, the art of shooting with a bow and arrow. This art, either as a means of offense in war, or as subsistence and amusement in time of peace, may be traced in the history of almost every nation. In the Middle Ages, the bow was much more used by the burghers than by the barons. The Swiss were famous archers. In modern times, this weapon is used by the Asiatic nations, by the tribes of Africa, by the American Indians, etc. This weapon was the leading arm of the English people for centuries. Great dependence was placed upon archers in war; and frequently has the success of a battle been attributed to their means, as at Cressy, Poitiers, and Agincourt. Most of the English sovereigns had a bodyguard entirely consisting of archers. In the reign of Charles II. the Royal Company of Archers, as it was called, became merged in the Artillery Company of London.

ARCHILL, ARGOL, ORCHILL, or ORCHAL, two species of lichen, the *rocella tinctoria* and *R. fusiformis*, which grow in the Canary and Cape Verde Islands. They are found on rocks near the sea. They produce a fine but fugitive purple dye, and are largely employed for that purpose. Other lichens, such as the *variolaria arcina*, the *lecanora tartarea*, etc., are sometimes used in place of the *rocella*.

ARCHIMEDES (ar-kē-mē'dēs), the most famous of ancient mathematicians, was a native of Syracuse. He possessed equal knowledge of the sciences of astronomy, geometry, hydrostatics, mechanics, and optics. Among his inventions were the combination of pulleys for lifting heavy weights, the revolving screw, and a spherical representation of the motion of the heavenly bodies. When Syracuse was taken by storm Archimedes was killed (212 B. C.). His burial place was afterward discovered by Cicero. Nine of the works of Archimedes have descended to posterity.

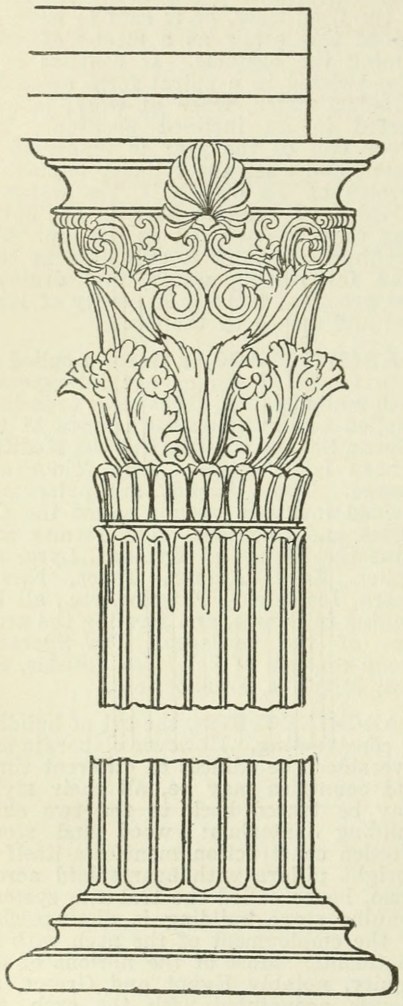
ARCHIMEDES, PRINCIPLE OF, a well known principle in hydrostatics, the discovery of which is attributed to the celebrated philosopher whose name it bears. This important theorem may be thus defined: When a solid is immersed in a fluid, it loses a portion of its weight, and this portion is equal to the weight of the fluid which it displaces, that is, to the weight of its own bulk of the fluid. This ingenious method is one way of ascertaining the specific gravity of solids, but it is not the most exact.

ARCHIMEDIAN SCREW, or SPIRAL PUMP, a machine invented by Archimedes, the celebrated Syracusan philosopher, while studying in Egypt. Observing the difficulty of raising water from the Nile to places above the reach of the flood tides, he is said to have designed this screw as a means of overcoming the obstacle. It consists of a pipe twisted in a spiral form around a cylinder, which, when at work, is supported in an inclined position. The lower end of the pipe is immersed in water, and when the cylinder is made to revolve on its own axis, the water is raised from bend to bend in the spiral pipe until it flows out at the top. The Archimedian screw is still used in Holland for raising water, and draining low grounds; there it is mostly of large size and moved by the wind.

ARCHIPELAGO, a term applied to such tracts of sea as are interspersed with many islands. It is more especially applied to the numerous islands of the Ægean Sea, or that part of the Mediterranean lying between Asia Minor and Greece. These islands are principally divided into two groups called the Cyclades and Sporades. The former contains the islands of Kythnos, Lyra, Seriphos, Keos, Anoros, Tenos, Naxos, Thera, Ios, Melos, Kimolos, etc., all belonging to Greece, and forming the province of the Cyclades. The Sporades group consists of Scio, Cos, Rhodes, Samos, Mitylene, Lemnos, etc.

ARCHITECTURE, the art of building or constructing. However elaborate and diversified the edifices of different times and countries may be, all their styles may be traced back to the two chief building materials: wood and stone. Wooden construction manifests itself in upright pillars with beams laid across them, hence called the trabeate system; genuine stone building is distinguished by the employment of the arch with its abutments. Most of the nations of antiquity, notably Egypt and Greece, although acquainted with the arch, adhered to the earlier and simpler trabeate type of the pillar and beam; and the details of their architecture, although executed in stone, show evidences of their wooden origin in the traditional wooden features of triglyphs, metopes, etc., with mortar or cement. After they had learned to build houses, they erected temples for their gods on a larger and more splendid scale than their own dwellings. The Egyptians are the most ancient nation known to us among whom architecture attained the character of a fine art.

Egyptian.—The history of architecture may be said to begin with the construction of the Egyptian pyramids, 3,000 years or more before the birth of Christ, but not until 2570 B. C. do we



CORINTHIAN ARCHITECTURE

find in Egypt a form of structure which contains the germ of a style practiced at a later age in Greece.

Assyrian.—Assyria comes next to Egypt for the age and importance of its buildings. The remains of some of these, which are chiefly palaces, are of great splendor. Among the oldest hitherto excavated is the Northwest Palace at Nimrod, built about 884 B. C.

Persian.—Persia possesses, in the remarkable ruins of palaces at Persepolis and Susa, built in the 5th and 6th centuries B. C., remains which bear a close resemblance to those of Assyria, the constructional parts of these Persian buildings being chiefly of marble, where those of the Assyrians were of wood, having been much better preserved.

Indian.—Examples of almost every kind of construction, both in wood and stone, are to be found in the various styles of this wonderful country. Until recent years, it was believed that the cave temples of India were of a very early date, but it has now been ascertained that none of these go further back than the 6th or 7th century of our era. All other ancient monuments in India, with the exception of the topes or pillars erected by the powerful ruler Asoka, are of still more recent date.

Grecian.—In historic times the Greeks developed an architecture of noble simplicity and dignity. This style is of modern origin compared with that of Egypt, and the earliest remains give indications that it was in part derived from the Egyptian. It is considered to have attained its greatest perfection in the age of Pericles, or about 460-430 B. C. The great masters of this period were Phidias, Ictinos, Callicrates, etc. Distinctive of it are what are called the orders of architecture, by which term are understood certain modes of proportioning and decorating the column and its superimposed entablature. The Greeks had three orders, called respectively the Doric, Ionic, and Corinthian. The most remarkable public edifices of the Greeks were temples of which the most famous is the Parthenon at Athens. The architecture of ancient Greece flourished from 650 to 324 B. C. Their theaters were semi-circular on one side and square on the other, the semi-circular part being usually excavated in the side of some convenient hill. A number exist in Greece, Sicily, and Asia Minor, and elsewhere. No remains of private houses are known to exist. By the end of the Peloponnesian War (say 400 B. C.) the best period of Greek architecture was over; a noble simplicity had given way to excess of ornament.

Roman.—The Romans borrowed their early architecture from that of Greece and Etruria. They built basilicas, baths, bridges, aqueducts, triumphal arches, and domestic buildings. Besides the Coliseum, the Pantheon, the Theater of Marcellus, and the remains of temples, baths, with their great vaulted halls, triumphal arches, and other monuments, still survive as examples of ancient architecture in Rome itself, built between the time of Augustus in the last century B. C., and that of Constantine in the 4th century

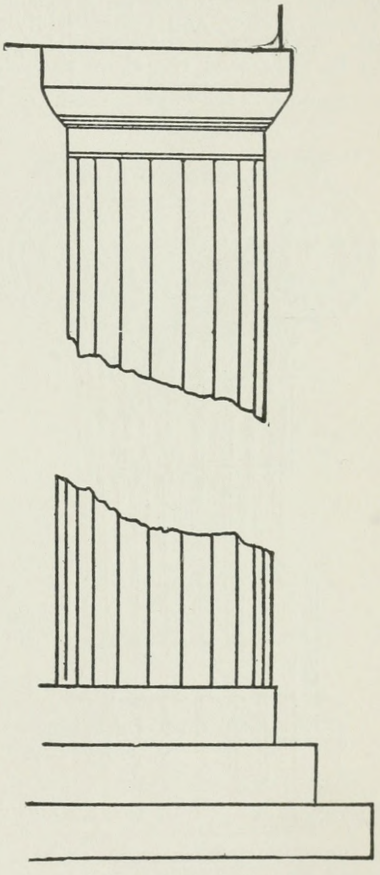
A. D. At Pompeii, there are interesting examples of the domestic architecture of the 1st century of our era.

Byzantine.—With the establishment of Byzantium as the capital of the empire, the Roman style of architecture was naturally much practiced there, and the development of the dome became from the first a chief object with the Eastern architects. Christians were first allowed to erect places of worship in the reign of Constantine the Great. The old basilicas or courts of justice were then turned into churches, for which they were well suited, the humbler schola, or hall of meeting, such as was used by the early Christians, as well as by heathen clubs and associations, rather than the basilica, may be the original form of the Christian Church. The name Byzantine is, strictly speaking, applicable only to the Christian architecture of eastern Europe and Asia Minor, from the reign of Justinian to the 11th century. One of the finest buildings in this style is the Church of St. Sophia, at Constantinople, founded by Constantine, but rebuilt by Justinian in 547 A. D. The Cathedral of San Vitale, at Ravenna, also erected in the 6th century, and St. Mark's, at Venice, built by architects from Constantinople in the 10th century, are two of the most perfect and interesting Byzantine churches in Italy.

Romanesque is the general term applied to all the various round-arched styles which arose in western Europe, after the irruptions of the barbarians had ceased. Teutonic Romanesque may be regarded as synonymous with Rhenish architecture. The Cathedrals of Spire, Mayence, and Worms are examples. Lombard architecture is the form of Romanesque practiced in Lombardy. Examples of it are to be seen in St. Ambrogio at Milan, St. Abondio at Como, and the cathedrals at Parma and Piacenza.

Saxon or Pre-Norman.—The Norman style would link on more naturally than this with the Teutonic Romanesque. But the Saxon is prior in point of date. It is simple, and has, as a rule, coarsely dressed masonry. In whole or in part, the churches of Bradford (Wilts), Earl's Barton, Worth, Monkwearmouth, and other places in England, are Pre-Norman.

Norman.—This style is also sometimes called Romanesque. No kind of architecture is better known in England and Scotland than the Norman, owing to the abundance of examples which remain. It is characterized by round-headed openings, by flat buttresses like pilasters, by cubical masonry, and by the richness and quaintness of the carving, especially on many of the doorways and chancel arches of even the smaller churches. Among the many examples in England may be mentioned the Cathedrals of Durham, Canterbury, Peterborough and parts of Lincoln and Winchester. In Scotland, Kirkwall Cathedral is the most complete example on a large scale.

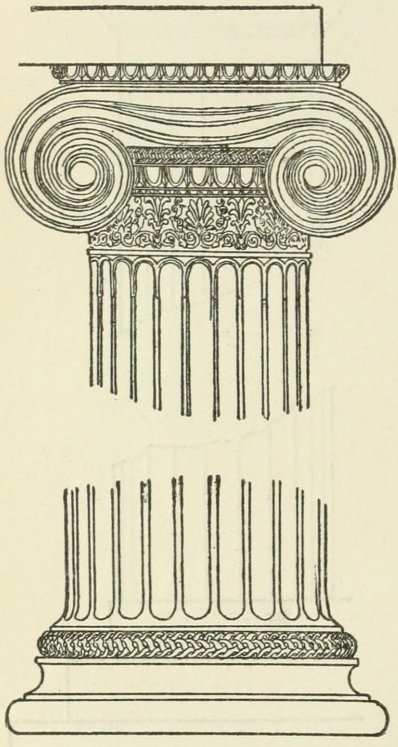


DORIC ARCHITECTURE

Early English or First Pointed Style.—As soon as the transition from the Norman to first pointed architecture was complete, the latter was characterized by its narrow pointed or lancet windows, without any, or with only very simple, tracery. Further distinguishing features are high gables and roofs, and simple pinnacles and spires. In England, Salisbury Cathedral is wholly in this style, so are the nave and transepts of Westminster Abbey. Scotland has good examples of it in the choir of Glasgow.

Decorated, Second Pointed, or Middle Pointed Style.—Windows are divided

into a number of lights by comparatively thin mullions, and their upper portions are filled with beautiful tracery, which at first was of geometrical forms, such as combinations of circles, trefoils, and quatrefoils. A continuation of the arch moldings, instead of shafts with caps, at length characterizes the jambs of the doorways. This is generally considered the most perfect and beautiful style of Gothic architecture. As examples of it may be mentioned the choir of Lincoln



IONIC ARCHITECTURE

and the nave of York Cathedral; and, in Scotland, portions of Melrose Abbey. The style continued from about 1274 to 1377. It then gradually stiffened into what is called the

Perpendicular, Third Pointed, or Late Pointed Style.—This is easily distinguished from the previous style by the tracery of the windows, which is characterized by an upright and square tendency. Perpendicular lines prevail in the windows as well as in the ornamental paneling. The doorways have square heads over the pointed arches. Gables and roofs are at a low angle. Clerestory windows are more frequently square-headed than arched. Westminster Hall, London, is an example of this style. The later portion of this period is sometimes called the Tudor style. The elaborately ornamented flamboyant style was the latest style of Gothic in France (15th and 16th centuries). The municipal architecture of the Middle Ages was largely Gothic in type.

Roman or classic architecture may be said to have never entirely died out in Rome, and when, in the 15th century, the revival of classic literature and taste took place, the ancient classic style of architecture naturally revived along with them. This is called the Italian Renaissance. Renaissance as applied to architecture means a revival of classical features and details as distinguished from those which characterize the Gothic. The Church of St. Peter's at Rome; the Pitti palace at Florence, various palaces on the Grand Canal at Venice, the Louvre and Tuileries, at Paris; the Banqueting House, in Whitehall, and St. Paul's Cathedral, London, are all examples of Renaissance.

Elizabethan Architecture, and the corresponding style on the Continent, is a variety of Renaissance, in which Gothic and Italian features are somewhat mixed. Holland House, near London, as well as Hatfield House, Burleigh House, and Hardwick Hall, are in this style.

Arabian, Saracenic, or Moorish.—This singular and beautiful style of architecture dates from the 9th century. It is noted for its graceful domes; for its minarets; for the frequent use of the pointed arch, and of the horseshoe arch; and in some cases for the peculiarly slender columns which support the walls above them. The flat or surface decorations are peculiarly striking and effective. These consist of diaper-work, often richly perforated, and of scroll-work of great variety, often of fairylike lightness. The Moorish Palace of the Alhambra and the Mosque of Cordova, in Spain, furnish striking illustrations of this kind of architecture.

Modern Architecture.—In the beginning of the 19th century, the habit of imitating ancient styles was established, and began to be applied to Gothic architecture also, which speedily came to be generally adopted, especially for ecclesiastical edifices. This was particularly the case in Great Britain, and among the Anglo-Saxon race wherever found—in the United States, India, and Australia, as well as at home. All modern architecture is imitative, and it is doubtful whether a really new style is possible. At present Gothic is generally adopted for churches, and Renaissance for domestic buildings.



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THE CACHE LEFT BY PEARY AT THE NORTH POLE



Photo by Frank Hurley. © *Underwood & Underwood*

A TITANIC UPHEAVAL OF ICE, IN AUGUST, 1915, WHICH PILED HUGE BLOCKS AROUND THE "ENDURANCE"



Photo by Frank Hurley. © *Underwood & Underwood*

SHACKLETON'S SHIP "ENDURANCE," CRUSHED BY ICE PRESSURE AND SINKING



©P. F. Collier & Son Company

AMUNDSEN'S DOG TEAM ON THE WAY TO THE SOUTH POLE



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AMUNDSEN AND DOG TEAM WITH THE FLAG OF NORWAY



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AMUNDSEN'S PARTY IN CAMP AT THE SOUTH POLE



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AMUNDSEN TAKING OBSERVATIONS AT THE SOUTH POLE



© *Wilse*

THE "FRAM" OUTSIDE AMUNDSEN'S HOME, CHRISTIANIA, NORWAY

ARCHITRAVE, in architecture, the part of the entablature which rests immediately on the heads of the columns, being the lowest of its three principal divisions, the others being the frieze and the cornice.

ARCHIVES, the place in which records are kept; also the records and papers which are preserved, as evidence of facts.

ARCHIVOLT, in architecture, the ornamental band of moldings on the face of an arch and following its contour.

ARCHONS, the chief magistrates of ancient Athens, chosen to superintend civil and religious concerns. They were nine in number; the first was properly the *archon*, or *archon eponymos*, by whose name the year was distinguished in the public records; the second was called *archon basileus*, or king archon, who exercised the functions of high-priest; the third, *polemarchos*, or general of the forces. The other six were called *thesmothetai*, or legislators.

ARC LIGHT, that species of the electric light in which the illuminating source is the current of electricity passing between two sticks of carbon kept a short distance apart, one of them being in connection with the positive, the other with the negative terminal of a battery or dynamo.

ARCOT (*Aru-Kadu*, "Six Deserts"), a city of British India, in the presidency of Madras, the capital of the district of North Arcot. It is situated on the right bank of the Palar, 65 miles W. S. W. of Madras. Arcot contains some mosques in a tolerable state of repair, and the ruins of the Nawab's palace. In 1751 Clive, with 300 Sepoys and 200 Europeans, marched against Arcot, and after having taken it, had in his turn to withstand a siege of 50 days. Arcot was afterward captured by the French, but retaken by Colonel Coote in 1760. It was taken and held for a time by Hyder Ali, but passed into the hands of the British in 1801. Pop. about 15,000. The districts of North and South Arcot form a portion of the presidency of Madras.

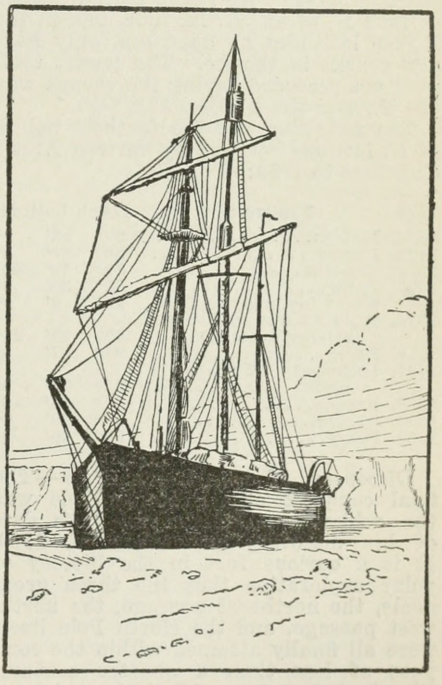
ARCTIC. (1) An adjective=bright, and (2) a substantive=a bear, so called either from his bright eyes or from his brilliant tawny fur. Before the Aryans had finally separated, *riksha*=bright, applied to the plow-like constellation, had become obsolete, and the substantive *bear* remained, whence the constellation came to be called *arktos* among the Greeks, *Ursa* among the Latins, and *Bear* among ourselves.

1. Properly, pertaining to the constellation called by the Greeks *arktos*=bear, by the Romans, *Ursa*, and by ourselves Ursa Major, the Great Bear, the Plow, Charles' Wain, etc.

2. Pertaining to the North generally, or more especially to the region within the Arctic Circle.

ARCTIC CIRCLE, a small circle of the globe, 23° 28′ distant from the North Pole, which is its center. It is opposed to the Antarctic circle, which is at the same distance from the South Pole.

ARCTIC and ANTARCTIC EXPLORATIONS, expeditions projected to explore the regions surrounding the North Pole. The object with which these enterprises were commenced by the Eng-



"THE FRAM," AMUNDSEN'S SHIP, IN THE ANTARCTIC ICE

lish was to obtain a passage by way of the polar regions to India. They have continued at intervals to our own times, and are not likely ever to cease. Two of the most notable events in their history which have hitherto occurred have been the discovery of the northwest passage by Captain McClure, of the "Investigator," on Oct. 26, 1850, and the tragic deaths of Sir John Franklin and his crew, about the year 1848, the catastrophe being rendered all the more im-

pressive to the public mind by the uncertainty which long hung over the gallant explorers' fate.

In September, 1895, Lieut. Robert E. Peary, of the United States navy, returned from an Arctic expedition, after an absence of two years. He did not get so far north as some of his predecessors, but in scientific results his expedition surpassed all others of recent years. His surveys and maps extend our knowledge of the coast northward 2°. He started on another expedition in 1897. On Aug. 13, 1896, Dr. Fridtjof Nansen, of Norway, returned from an Arctic expedition, after an absence of more than three years. The most northerly point reached by him was 86° 14′ N. latitude, or 200 miles nearer the Pole than ever reached before. He found no indications of land N. of 82° N. latitude, and in the higher latitudes no open sea, only narrow cracks in the ice. The lowest temperature recorded during the voyage was 62° F., and the highest 37½° F.

The following are the farthest points of N. latitude reached by various Arctic explorers to 1920:

Year	Explorers	North Latitude		
1607.	Hudson	80°	23′	0″
1773.	Phipps	80°	48′	0″
1806.	Scoresby	81°	12′	42″
1827.	Parry	82°	50′	0″
1874.	Meyer (on land)	82°	0′	0″
1875.	Markham and Parr (Nares' expedition)	83°	20′	26″
1876.	Payer	83°	07′	0″
1884.	Lockwood (Greeley's party)	83°	24′	0″
1896.	Nansen	86°	14′	0″
1900.	Abruzzi	86°	33′	0″
1909.	Peary	90°	00′	0″

Discovery of the North Pole.—The final conquest of the North Pole was the achievement of Peary. The date of his discovery was April 7, 1909. It is a curious fact in the history of polar exploration that the three great goals, the northeast passage, the northwest passage, and the North Pole itself were all finally attained within the compass of less than a quarter century. The first two were relatively unimportant. Both the northeast and the northwest passage had been sought for centuries as a goal of commerce with the Orient. They were finally traced merely as feats of polar exploration, both by Norwegians—in the last of the nineties and first decade of the twentieth century; the former by Baron Nordenskjöld in 1878-1879, and the latter by Raold Amundsen in 1903. The search for the magnetic north pole of the earth, culminating in Peary's triumph, had been constant and eager for the half century preceding.

Peary's third voyage in 1898 had the conquest of the Pole for its immediate object. He was by this time fully convinced that the only possible way to get there was to adopt the manner of life of the Eskimos, their food, clothing, snow-houses; to live as much as possible on the game which he had so far found comparatively abundant, thus avoiding scurvy, and to train Eskimos as his sledge-crews. His whole plan and equipment also in many respects was different from any man's before him. He was gone this time nearly four years, achieved further surveys and re-surveys in Smith Sound, Grinnell Land, and to the north of the mainland of Greenland, passed Lieutenant Lockwood's farthest north of 1883, to a point 83° 39′ N., and made a brilliant record in sledge-work. But he did not reach the Pole by 456 miles. He had tried each year by sledges, from a base about 700 miles from his objective, and during these journeys he mapped hundreds of miles of coast line in a hitherto unmapped region.

The second voyage in the "dash for the Pole," as Peary called his sledge-journeys, was undertaken in a specially constructed vessel which reached the highest point in shipbuilding for its particular purpose, and was named the "Roosevelt" in honor of Theodore Roosevelt, which left the shores of America in June, 1905. The result of this voyage was the attainment of a still farther lat. 87° 6′—the highest yet won.

His record up to and including this one as an advance over Lieutenant Greeley's (Lockwood's) farthest in 1882 was: in 1900, 30 miles; 1902, 23 miles; 1906, 169 miles. There remained 174 miles to his goal. In July, 1908, Peary again turned his face northward in the "Roosevelt" to the final accomplishment of his purpose. He was now fifty-two years old, much older than other great polar explorers when they reached the height of their career, but he had been longer in the farthest north than any other explorer ever had been—had passed more winters there—had mapped more country—knew the Eskimo better—in fact had gained their most perfect friendship—and had trained them to be his faithful and efficient helpers. All this knowledge and experience intimated the possession of personal qualities of the highest type for his task.

The members of Peary's expedition were Robert A. Bartlett, his Sailing-Master; George A. Wardwell, Chief Engineer; Dr. J. W. Goodsell, Surgeon; Ross G. Marvin, Donald B. Macmillan, George Borup, and Matthew A. Henson, a negro. Etah in Greenland was reached

August 11, and 22 Eskimos, 246 dogs, and renewed supplies of coal and fresh meat were taken aboard. Winter quarters were established at Port Sheridan, a little north of those of 1905. The following February, with the return of the Arctic day, a chain of depots was started. Peary's base was the land mass "thought to be nearest the Pole." The march over the ice began March 1st. Ten days later, in lat. 84° 29′, a portion of the party returned under Dr. Goodsell; when 85° 25′ had been attained, a second section under Borup returned. Peary persisted with 12 men, 10 sledges, and 80 dogs. A third section under Marvin lessened this party and finally a fourth commanded by Captain Bartlett started back when 87° 48′ was reached. Peary now had with him only the negro Henson, four Eskimos, and forty picked dogs. There were 125 miles still to traverse, which was done in five days' marches of equal length, 89° 57′ being reached on the 6th of April. Peary collapsed here from exhaustion when within actual sight of his goal. The following day he reached it and planted the Stars and Stripes at the apex of the earth—one of the greatest achievements of the centuries.

For his exploit Peary received gold medals from numerous scientific bodies, was promoted to the rank of rear admiral for life, and received the thanks of Congress. He was given the cordon of a grand officer of the Legion of Honor of France in 1913. His own record of his career is full—including "Northward Over the Great Ice" (2 vols., 1898); "Snowland Folk" (1904); "Nearest the Pole" (1907); and the "North Pole" (1910).

Later explorations have been conducted by McMillan, Stefansson, Amundsen, and others. These have added greatly to our knowledge of the geography for the Arctic regions.

Antarctic Explorations.—One of the chief features which distinguishes the Antarctic polar region from the Arctic is the constant presence of high and violent winds of a much severer and more prolonged character than those encountered in the north. Its coasts also are more difficult to approach because of the size and formation of its glaciers, and the presence of frequent oceanic ice-caps. The southern polar region has been little exploited in comparison with the North Pole up to a very few years ago. The latter was almost in the track of the hardy navigators who for centuries tried to find a northeast or northwest passage to the east. The Antarctic region offered no temptation whatever to maritime enterprise. Ships had rounded South America's most southerly point since Magellan's time—after whom the Straits of Magellan are named—and there was nothing but the vaguest rumor to tempt the mariner farther south. The quest of the South Pole, the exploration of the Antarctic regions, were purely matters of scientific enterprise which were only to be inaugurated after the opposite polar regions had beeen thoroughly mapped. It is a curious fact, however, that both poles were only finally discovered within a few years of each other; Peary reaching his goal April 7, 1909, while Amundsen found the South Pole Dec. 14, 1911.

The Antarctic area approaching the Pole from all sides is divided by geographers into four sections or quadrants named from adjacent lands and waters America, Africa, Australia, and Pacific.

The African quadrant is still an unknown region, as the latitude of 70° S. has not yet been reached, and no land of any importance discovered. Into the American section the continent of Antarctica projects its most northerly coast. It was discovered by Captain Nathaniel B. Palmer, an American Yankee sealer, in 1820. It was first called Palmer Land (1882), and through gradual exploration has assumed the dimensions of a continent extending now from lat. 63° to 70° S. and long. 52° to 77° W. There was a short exploratory period following Palmer's original discovery. Biscoe (1831) reaching 67° S., 72° W., D'Urville (1838) renaming parts of the land for the French under whose flag he sailed, and Ross, who in 1843 added the vast expanse known as Cockburn Island.

Exploration ceased for a time, the whaler Dallmann, some 30 years after (1873) reaching 64° 45′ S. Twenty years later (1892) Robinson discovered Dundee Island. Larsen, sailing under the flag of Sweden in 1893, found fossils on Seymour Land and added land along the east coast of Palmer Land to 68° 10′, which he called King Oscar Land. Evensen in the same year attained 69° 10′ S., 76° 12′ W. Sweden had by this time taken up Antarctic exploration very seriously, and a few years later a thoroughly well-planned scientific expedition under Baron Nordenskjöld set out for the South Polar regions. Nordenskjöld discovered two flora of the Jurassic and Tertiary periods on Seymour Island, and mapped the eastern coast of Palmer Land to 66° 8′. A French explorer, Charcot, on two voyages, 1903 and 1910, extended the coast of Palmer Land to the southwest. He made important discoveries that added much to

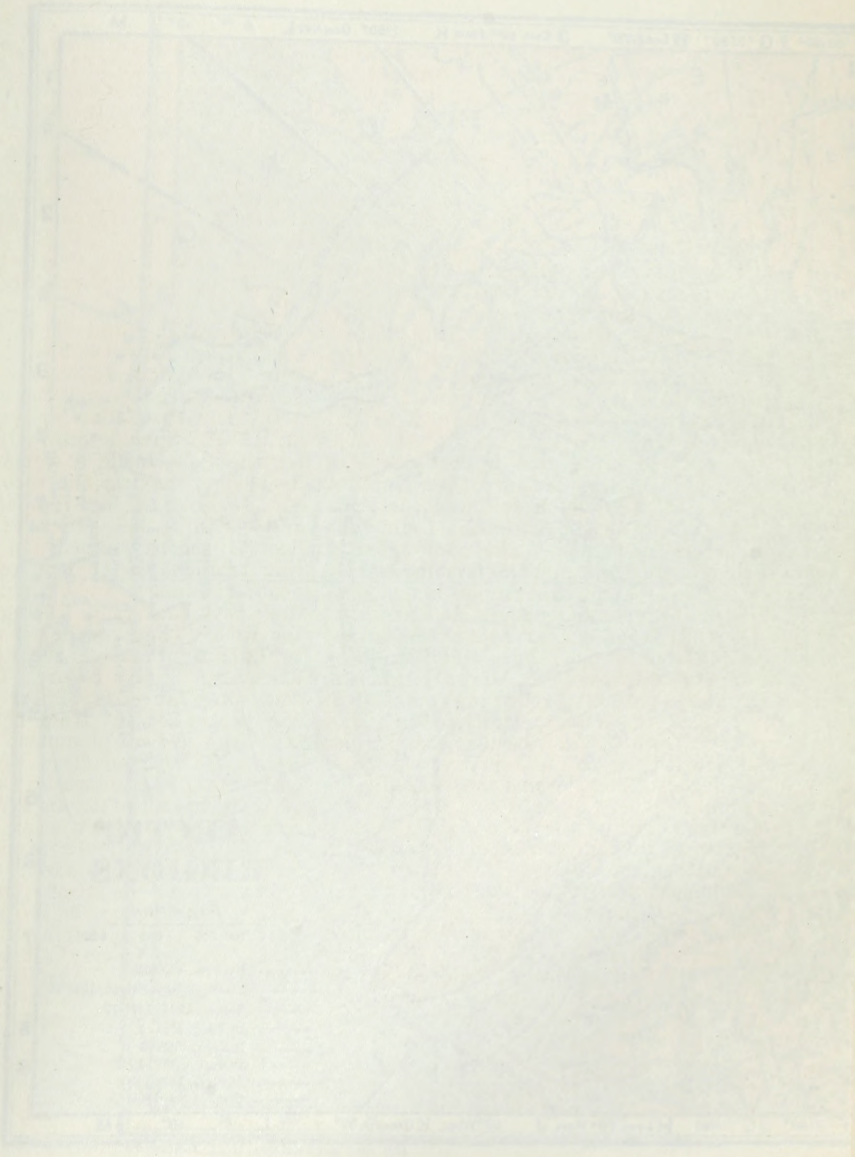
the knowledge of the region. He navigated through what he named the *Pourquoi Pas?* from 60° to 124° W., chiefly between lat. 69° and 70°, sailing a great deal of unknown water. He discovered two entirely new regions which he named Loubet Land in honor of the President of France, and Charcot Land, presumably in honor of himself. His chief contribution to South Polar geography was the proof that Palmer Land was a vast continuous area—in reality a continent, and not divided by water as previous explorers had held. Following these and previous explorations, there has ensued a development of the fisheries of these regions totaling yearly several million dollars, over which from 50° S. Great Britain has proclaimed control.

The Australian quadrant has always been regarded as the nearest and best way of reaching the South Pole itself. The largest portion of Antarctica, too, lies in this boundary. Still it was the last to invite the explorer. The first credit belongs to a Captain Balleny (1839), who added five islands to the maps in long. 165° E., lat. 67° S. The first enterprise of real importance was the small U. S. squadron under Captain Wilkes (1840), which followed the Antarctic circle for 1,600 miles. Land was seen now and then. The same year a French squadron under D'Urville discovered Adelie Land, whereupon a meteorological station was located. He was about 700 miles from Wilkes' route. Other so-called land mapped by D'Urville, however, later proved to be only glacier. Drygalski (1902), following largely in the track of Wilkes, confirmed his discoveries, which had been more or less discredited for half a century. Lieutenant Ernest Shackleton's two expeditions in this section—in 1909 and 1912—were highly important to the annals of exploration so far as it could be extended in such a region. Douglas Mawson set out from Australia in 1911 to explore much debatable country. He added King George V. Land to the map, extending as far south as lat. 70° 30′ S. His companion Wild, meantime, discovered and mapped Queen Mary Land. Davis (1912) discovered unknown land between Mawson and Wild.

All these discoveries, extending over 55 degrees of longitude, have finally given some reality to the size of the great ice-continent, and it is now believed beyond question that Antarctica stretches unbroken between the Kaiser Wilhelm Land of Drygalski (1902) 86° E. and Carmel Land, discovered by Amundsen, in 158° W. over 116 degrees of longitude. Mawson discovered glaciers in King George Land, which cover more than 1,000 square miles in the ocean. One of Lieutenant Shackleton's discoveries was an ice-cap—named for him—covering 36,000 square miles of the Antarctic Ocean, and 180 by 200 miles in length and breadth. The largest ice-cap known, however, is Ross' Barrier, discovered by Ross (1841), of which Scott, one of Shackleton's lieutenants, estimates the surface area at 120,000 square miles, which is larger than the states of New York and Pennsylvania combined. No sketch of Antarctic discovery should omit the great value of the finds of J. C. Ross (1841). He added nearly 8 degrees of longitude to Victoria Land, discovered the Ross "Barrier," and reached lat. 78° 10′ S., long. 161° 27′ E. Borchgrevink (1900) passed the first winter by man within the Arctic Circle and reached 78° 50′.

Scott, of England (1901-1903), discovered King Edward VII. Land between long. 152° and 153° W. He made a definite effort to reach the southern magnetic pole the following year, attaining 82° 17′ S. Shackleton, in 1909, in a dash for the Pole, made a wonderful journey, by sledge, making the record of 88° 23′ S. He got within 97 miles of the Pole and within 366 miles of the record. Scott's second expedition (1911-1913), was tragical, in that it resulted in the death of himself and four companions on their way back from having finally found the Pole. They reached it Jan. 18, 1912, to find Amundsen's record of his own discovery 35 days before. Roald Amundsen, long inured to Polar adventure in the north, set out from Norway in 1911 with the avowed conquest of the South Pole. He started from the edge of the great Ross Barrier where he had wintered in sledges, and after an 870 mile journey located the southern apex of the planet on Dec. 14, 1911. It is on a plateau of 10,500 feet altitude above sea-level—and there are no mountains in the vicinity. Amundsen also made the important discovery of the southerly extremity of the Ross oceanic ice-cap (Ross Barrier) in 85° S. 164° W., adding to the knowledge of the extent of the continent of Antarctica. See AMUNDSEN, ROALD.

ARCTIC OCEAN, that part of the water surface of the earth which surrounds the North Pole, and washes the northern shores of Europe, Asia, and America; its southern boundary roughly coinciding with the Arctic circle (lat. 66° 32′ N.). It incloses many large islands, and contains large bays and gulfs which deeply indent the northern shores of the three continents.





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ARCTIC REGIONS, the regions round the North Pole, and extending from the Pole on all sides to the Arctic Circle in lat. 66° 32′ N. The Arctic, or North Polar Circle, just touches the northern headlands of Iceland, cuts off the southern and narrowest portion of Greenland, crosses Fox Strait N. of Hudson's Bay, whence it goes over the American continent to Bering Strait. Thence it runs to Obdorsk at the mouth of the Obi, then crossing northern Russia, the White Sea, and the Scandinavian Peninsula, returns to Iceland. Valuable minerals, fossils, etc., have been discovered within the Arctic regions. In the archipelago N. of the American continent, excellent coal frequently occurs. The mineral cryolite is mined in Greenland. Fossil ivory is obtained in islands at the mouth of the Lena. In Scandinavia, parts of Siberia, and northwest America, the forest region extends within the Arctic circle. The most characteristic of the natives of the Arctic regions are the Eskimos. The most notable animals are the white bear, the musk ox, the reindeer, and the whalebone whale. Fur-bearing animals are numerous.

ARCTURUS, in astronomy, a fixed star of the first magnitude, called also Alpha Boötes. It is one of the very brightest stars in the northern heavens. Though nominally fixed, yet it has a proper angular motion of 2.250′, equivalent to 53.32 miles in a second. In 752 years it altered its latitude 5′, and in 20 centuries, according to Humboldt, it has moved 2½ times the diameter of the moon's disk. In 1803, Herschel found its diameter, seen through a fog, 2-10 of a second, from which he calculated its diameter to be not less than 8,000,000 leagues.

ARDAHAN (ar-dän′), a village of about 300 houses, in the portion of Turkish Armenia, ceded in 1878 to Russia, 35 miles N. W. of Kars. Its position gives it strategic importance. Its fortress was dismantled by the Russians in the war of 1854-1856; in 1878 the Berlin Congress sanctioned the cession to Russia of Ardahan, which had been captured early in the war.

ARDEBIL, a town of Persia, in the province of Azerbijan, 110 miles E. of Tabriz, and some 5,000 feet above the sea. Pop. about 10,000.

ARDÈCHE (ar-dāsh′), a department in the south of France, takes its name from a tributary of the Rhone, and includes part of ancient Languedoc. It is almost wholly mountainous. In the N. W. of the department, the Cevennes culminate in the volcanic Mont-Mezène, 5,752 feet in height. Numerous extinct volcanic peaks, deep craters, grottos, rock labyrinths, and basaltic columns give an extraordinarily picturesque appearance to the scenery. The upland, where winter reigns for six or eight months, is devoted to pasturage; but the valley of the Rhone produces wine, olives, chestnuts, figs, and almonds. Only a fourth of the area is cultivated. Iron, coal, antimony, lead, marble, and gypsum are wrought. There are manufactures of silk, paper, leather, cloth, and straw. Area, 2,136 square miles; pop. about 350,000. The capital is Privas.

ARDENNES (ar-dān′), an extensive hill-country and forest, ocupying the S. E. corner of Belgium, between the Moselle and the Meuse, but extending also into France and Rhenish Prussia. It consists of a broken mass of hills, for the most part of no great elevation, which gradually slope toward the plains of Flanders. The channel of the Meuse is in some places bound in by rugged and precipitous cliffs more than 600 feet high. The wealth of the region is its wood and its minerals. Enormous supplies of coal are found in the north, a very important element in Belgium's industrial wealth; iron, lead, antimony, copper, and manganese are also found. Multitudes of cattle and sheep are reared. In the World War (1914-1918) the Ardennes saw much severe fighting. See WORLD WAR.

ARDENNES, a frontier department of France, bordering on Belgium. It is named from the forest of Ardennes, and formed a part of the old province of Champagne; area, 2,020 square miles. The N. E. belongs to the basin of the Meuse; the S. W. is watered by the Aisne; these rivers being united by a canal. About two-fifths of the whole surface is hilly, and covered with forests and wide tracts of pasturage. In the N., marble is obtained. South of this, and stretching across the department from E. to W., are great layers of slate. Only the valleys are fertile, and produce corn. The vine is cultivated in the S. W. Cattle and sheep are reared. Slate, marble, iron, clay, copper, and coal are found. Iron working is largely carried on; but the chief industry is cloth-making, especially in Sedan. There are also manufactures of clay pipes, glass, paper, sugar, and beer. The capital is Mézières, but the most important place is the great fortified city of Sedan. Pop. of department about 320,000. In the World War the department was the scene of some of the greatest battles between the German and the Allied forces.

On Nov. 3, 1918, the First American Army destroyed the Mézières-Metz railway, and Nov. 6 gained the heights of the Woevre and Sedan. On Nov. 9 the French invested Mézières. See WORLD WAR.

ARDMORE, a city of Oklahoma, the county-seat of Carter co. It is on the Santa Fé, the Rock Island, San Francisco and Oklahoma, and the New Mexico and Pacific railroads. It has several important educational institutions. Its chief industries are cotton and asphalt. There are important oil wells and deposits of natural gas in the neighborhood. It is also the center of an important stock-raising and agricultural community. Pop. (1910) 8,618; (1920) 14,181.

ARDNAMURCHAN (-mur'kan) **POINT**, the most westerly point of the island of Great Britain, in Argyllshire, having a lighthouse, 180 feet above sea-level, visible 18 to 20 miles off.

ARDOCH, a parish in south Perthshire, celebrated for its Roman remains, one, a camp, being the most perfect existing in Scotland.

ARE, the unit of the French land measure, equal to 100 square meters, or 1,076.44 square feet. A hectare is 100 ares, equal to 2.47 acres.

ARECA, a genus of lofty palms with pinnated leaves, and a drupe-like fruit inclosed in a fibrous rind. *A. catechu*, of the Coromandel and Malabar coasts, is the common areca palm which yields areca or betel nuts, and also the astringent juice catechu. *A. oleracea* is the cabbage tree, or cabbage palm of the West Indies. With lime and the leaves of the betel pepper, the areca nuts, when green, form the celebrated masticatory of the East. They are an important article in Eastern trade.

ARECIBO (ar-ā-sē'bo), an important commercial town of Porto Rico; on the N. coast; facing the Atlantic Ocean; 50 miles W. of San Juan. Tributary to the town is a district of about 30,000 inhabitants. Pop. (1920) 10,039.

ARENA, the inclosed space in the central part of the Roman amphitheaters, in which took place the combats of gladiators of wild beasts. It was usually covered with sand or sawdust to prevent the gladiators from slipping, and to absorb the blood.

ARENACEOUS ROCKS, rocks composed entirely, or to a large extent, of grains of quartz. Beds of loose sand occur extensively in the more recent deposits. Silvery flakes of mica are seldom absent; and they often occur in layers parallel to the planes of stratification, causing the rock to split into thin slabs, and exposing a glittering surface. These are called micaceous sandstones. When grains of feldspar occur, it is a feldspathic sandstone. Often large quantities of calcareous matter, either as cement or as distinct grains, occur; and these are called calcareous sandstones. In like manner we have siliceous and ferruginous sandstones, when silica and oxide of iron are conspicuously present as cementing or binding materials. Clay and carbonaceous matter, when plentifully diffused through the rock, give rise to argillaceous, carbonaceous, and bituminous sandstones. Greensand, or glauconitic sandstone, is a rock containing abundant grains of the dirty greenish mineral called glauconite. Arkose is a sandstone composed of disintegrated granite; volcanic sandstone, trappean sandstone, etc., being composed of disintegrated igneous rocks. A sandstone of homogeneous composition, which may be worked freely in any direction, is called freestone or liver rock. Flagstone is a sandstone which is capable of being split into thin beds or flags along the planes of deposition. When the sandstone is coarse-grained, it is usually called grit. If it contain, more or less abundantly, grains large enough to be called pebbles, the sandstone is said to be conglomeratic; and if the pebbles or stones be angular, the rock is described as a brecciiform sandstone. Coarse-grained grits and pebbly or conglomeratic sandstones pass into conglomerate or puddingstone, which consists of a mass of various-sized water-worn stones. Brecciiform sandstones frequently pass into breccia, which is an aggregate of angular and sub-angular fragments. Graywacke is an argillaceous sandstone, more or less altered and sometimes semi-crystalline, met with among palæozoic formations.

AREOLAR TISSUE, a tissue widely diffused through the body, and composed of white and yellow fibers, the former imparting to it strength, and the latter elasticity. Areolar tissue protects from injury the parts of the body in which it occurs, and when placed in the interstices of other tissues it keeps the latter from moving as freely as otherwise they would. The *cutis vera*, or true skin, is composed of it.

AREOMETER (ar-ē-om'ē-ter), an instrument designed to measure the specific gravity of liquids. The simpler areometers measure only the relative weights of liquids. They consist of a

tube of glass, terminated in a ball at its lower part, and divided into equal portions through its whole length. Another ball filled with mercury is soldered below to keep it vertical. The depth to which it sinks in various liquids is in the inverse ratio of their relative specific gravities.

AREOPAGUS (ar-ē-op'ā-gus), the name of a hill or rocky eminence lying to the W. of the Acropolis at Athens, which was the meeting-place of the chief court of judicature of that city; hence called the Council of Areopagus. It was of very high antiquity, and existed as a criminal tribunal long before the time of Solon, who enlarged its sphere of jurisdiction. As a court of justice, it took cognizance of capital crimes, as murder, arson, etc.; and it also exercised a certain control over the ordinary courts. Its censorial duties were of a very extensive and inquisitorial nature, for the preservation of order and decency. Religion also came within its jurisdiction, which punished impiety in whatsoever form. Pericles succeeded in greatly diminishing the power of this council, and deprived it of many of its old prerogatives.

AREQUIPA (ar-a-kē'pa), a city of Peru, capital of the department of the same name (area 21,951 square miles; pop. about 300,000); 40 miles from the Pacific Ocean, on the Chile river; altitude, 7,850 feet above sea-level. It is a bishop's seat, has a college, several convents, and a cathedral. Its trade is large. Gold and silver are mined in the vicinity. A great earthquake occurred Aug. 13 and 14, 1868, which destroyed much property and killed 500 persons. Near by Harvard University has an observatory, at an altitude of over 8,000 feet. Pop. about 40,000.

AREZZO (a-rēt'sō, ancient Arretium), a city of central Italy, capital of a province of the same name in Tuscany, near the confluence of the Chiana with the Arno. It has a noble cathedral, remains of an ancient amphitheater, etc. It was one of the 12 chief Etruscan towns, and in later times fought long against the Florentines, to whom it had finally to succumb. It is the birthplace of Mæcenas, Petrarch, Pietro Aretino, Redi, and Vasari. Pop. about 50,000. The province of Arezzo contains 1,273 squares miles. Pop. about 300,000.

ARGALL, SIR SAMUEL, an early English adventurer in Virginia, born about 1572; planned and executed the abduction of Pocahontas, the daughter of the Indian chief Powhatan, in order to secure the ransom of English prisoners. He was Deputy-Governor of Virginia (1617-1619), and was accused of many acts of rapacity and tyranny. In 1620 he served in an expedition against Algiers, and was knighted by James I. He died in 1639.

ARGAND LAMP, a lamp named after its inventor, Aimé Argand, a Swiss chemist and physician (born 1755; died 1803), the distinctive feature of which is a burner forming a ring or hollow cylinder covered by a chimney, so that the flame receives a current of air both on the inside and on the outside.

ARGEMONE (ar-jem'ō-nē), a genus of plants belonging to the family *papaveraceæ*, or poppy-worts. It has three sepals and six petals. The *A. Mexicana*, believed, as its name imports, to have come from Mexico, is now common in India and other warm countries in the Old World, as well as in the New. It has conspicuous yellow flowers. From having its calyx prickly, it is often called Mexican thistle. The yellow juice, when reduced to consistence, resembles gamboge. It is detersive. The seeds are a more powerful narcotic than opium.

ARGENT, in coats of arms, the heraldic term expressing silver; represented in engraving by a plain white surface.

ARGENTA, a city of Arkansas, in Pulaski co. It is on the Arkansas river, and on the St. Louis Southwestern, the St. Louis, Iron Mountain, and Southern, and the Chicago, Rock Island and Pacific railroads. The chief industries are railroad shops, cotton and oil mills, and boiler and iron works. There is a hospital and other public institutions. Fuel is supplied by natural gas. It is the center of an important agricultural region. Pop. (1910) 11,138; (1920) 14,048.

ARGENTINA, or ARGENTINE REPUBLIC, formerly called the United Provinces of La Plata, a vast country of South America; extreme length 2,300 miles; average breadth a little over 500 miles; total area, 1,138,000 square miles. It is bounded on the N. by Bolivia; on the E. by Paraguay, Brazil, Uruguay, and the Atlantic; on the S. by the Antarctic Ocean; and on the W. by Chile. Pop. (1918) 8,280,266.

Natural Divisions.—It comprises four great natural divisons: (1) The Andine region, containing the provinces of Mendoza, San Juan, Rioja, Catamarca, Tucuman, Salta, and Jujuy. (2) The Pampas, containing the provinces of Santiago, Santa Fé, Cordova, San Luis, and Buenos Aires; with the territories Formosa, Pampa, and Chaco. (3) The Argentine

Mesopotamia, between the rivers Parana and Uruguay, containing the provinces of Entre Rios and Corrientes, and the territory Misiones. (4) Patagonia, including the eastern half of Tierra del Fuego. With the exception of the N. W., where lateral branches of the Andes run into the plain for 150 or 200 miles, and the province of Entre Rios, which is hilly, the characteristic feature of the country is the great monotonous and level plains called pampas. In the N. these plains are partly forest-covered, but all the central and S. parts present vast treeless tracts, which afford pasture to immense herds of horses, oxen, and sheep.

Water Courses.—The great water course of the coutry is the Paraná, having a length of fully 2,000 miles from its source in the mountains of Goyaz, Brazil, to its junction with the Uruguay, where begins the estuary of La Plata. The Paraná is formed by the union of the Upper Paraná and Paraguay rivers, near the N. E. corner of the country. Important tributaries are the Pilcomayo, the Vermejo, and the Salado. The Paraná, Paraguay, and Uruguay are valuable for internal navigation. Not connected with the La Plata system are the Colorado and the Rio Negro, the latter formerly the S. boundary of the country, separating it from Patagonia. The source of the Negro is Lake Nahuel Huapi, in Patagonia (area, 1,200 square miles), in the midst of magnificent scenery. The level portions of the country are mostly of tertiary formation, and the river and coast regions consist mainly of alluvial soil of great fertility. In the pampas clay have been found the fossil remains of extinct mammalia, some of them of colossal size.

Productions.—European grains and fruits, including the vine, have been successfully introduced, and are cultivated to some extent in most parts of the republic, but the great wealth of the state lies in its countless herds of cattle and horses and flocks of sheep, which are pastured on the pampas, and which multiply there very rapidly. Gold, silver, nickel, copper, tin, lead, and iron, besides marble, jasper, precious stones, and bitumen are found in the mountainous districts of the northwest, while petroleum wells have been discovered on the Rio Vermejo.

Argentina has developed in the last decade greatly in agriculture and stock raising, which are the principal sources of wealth of the country. There are estimated to be over 250,000,000 acres suitable for agriculture and grazing, and an additional 10,000,000 acres can be made available by irrigation. The acreage and production of the principal crops in 1918-1919 was as follows: wheat 17,175,000 acres, 5,015,000 tons; oats, 3,015,000 acres, 640,000 tons; flax, 3,466,625 acres, 705,000 tons. The production of maize and corn in 1917 was 4,335,000 tons. There were in the country in 1918 about 3,000,000 head of cattle. The world demand for grain and meat, following the end of the World War, conditioned great prosperity in Argentina.

Commerce.—The total value of the trade in 1917 was 1,307,392,000 pesos, gold (a peso equals 96.4 cents). The imports amounted to 480,896,000 pesos, and the exports to 826,496,000 pesos, leaving a balance in favor of Argentina of 345,600,000 pesos. The exports exceeded those of any former year both in bulk and value. The chief imports were from the United States, amounting to 169,500,000 pesos. The chief exports were to the United Kingdom, amounting to 305,800,000 pesos. The large increase in the exports to the United Kingdom during 1917 was due largely to shipments of wheat. The exports to the United States were valued at 165,100,000 pesos. In addition to wheat, the chief exports were flour, linseed, corn, oats, and meat.

Education.—Education in the elementary grades is free and is carried on under subsidiaries by provincial boards of education. There are nearly 9,000 public primary schools, with over 1,000,000 pupils and about 32,000 teachers. There are also about 1,000 private primary schools, with about 77,000 pupils and about 4,000 teachers. Secondary education is carried on through 37 national colleges, which are attended by about 12,000 pupils. There are also many normal schools and schools for special instruction, etc. There are 5 national universities, those of Buenos Aires, La Plata, Cordova, Santa Fé and Tucuman. There are over 10,000 students at the University of Buenos Aires. The total expenditure for educational purposes in 1918 was about 60,000,000 paper dollars.

Finance.—The total revenue in 1918 was 373,412,306 paper dollars, and the expenditures 390,989,480 paper dollars. The paper dollar has the value of about 42c. in American money. The chief expenditures are for the public debt, education, army, navy, and pensions.

Transportation.—There were in 1918 about 22,500 miles of railway, of which about 4,000 belonged to the state. Vessels entering the harbors and ports number nearly 50,000 annually. There were about 3,500 post offices and about 44,000 miles of telegraph, of which about 24,000 are national.

Army and Navy.—There is a compulsory military law which has produced an efficient army. There are five military districts, each of which supplies a division of 20,000 men, with a reserve of about 250,000. The navy includes two large dreadnoughts of nearly 30,000 tons each. There are also armored cruisers, protective cruisers, gun boats, torpedo boats and miscellaneous craft.

People.—As a whole, this vast country is very thinly inhabited, some parts of it as yet being very little known. The native Indians were never very numerous, and have given little trouble to the European settlers. Tribes of them yet in the savage state still inhabit the less known districts, and live by hunting and fishing. Some of the Gran Chaco tribes are said to be very fierce, and European travelers have been killed by them. The European element is strong in the republic, more than half of the population being Europeans or of pure European descent. The typical inhabitants of the pampas are the Gauchos, a race of half-breed cattle-rearers and horse-breakers.

History.—The river La Plata was discovered in 1512 by the Spanish navigator Juan Diaz de Solis, and the La Plata territory had been brought into the possession of Spain by the end of the 16th century. In 1810 the territory cast off the Spanish rule, and in 1816 the independence of the United States of the Rio de la Plata was formally declared. The present constitution dates from 1853, being subsequently modified. The executive power is vested in a President, elected by the representatives of the 14 provinces for a term of six years. A National Congress of two chambers—a Senate and a House of Deputies—yields the legislative authority. The capital of the republic is BUENOS AIRES (*q. v.*). Argentina was the only important South American country which did not break off diplomatic relations with Germany during the war. This caused great discontent among the people of the country. The failure to sever relations with Germany was attributed largely to the activities of Count Carl Luxburg, the German minister. He was extremely active carrying on German propaganda and this came to a head in September, 1917, when telegrams from him to the German War Office were made public. These telegrams contained extremely damaging matter, the most famous containing the advice from Luxburg to the German Government to sink Argentine ships "spurlos" (without leaving a trace), if they were to be attacked at all. The publication of this correspondence caused great excitement both in the United States and in Europe. Luxburg was recalled. Public sentiment even before this had been strongly against neutrality, and President Irigoyen, who had apparently strong German sympathies, was bitterly attacked. In April a mob wrecked the offices of the German newspapers in Buenos Aires and attacked the German legation. These disturbances were quieted, but broke out again on the publication of the Luxburg correspondence. There were serious industrial disturbances in 1919, including strikes in the port of Buenos Aires. Collisions between strikers and police occurred and many persons were killed. The strike spread throughout the country and threatened to be general, but was finally ended without more serious trouble. During the year there were over 260 strikes, involving about 265,000 workmen.

ARGENTINE, a silvery-white slaty variety of calc-spar, containing a little silica with laminæ usually undulated. It is found in primitive rocks and frequently in metallic veins. Argentine is also the name of a small British fish (*scopelus borealis*), less than two inches long, and of a silvery color.

ARGENTITE, sulphide of silver, a blackish or lead-gray mineral, a valuable ore of silver found in the crystalline rocks of many countries.

ARGILLACEOUS ROCKS are rocks in which clay prevails (including shales and slates).

ARGINUSÆ (ar-gin'ö-sē), a number of small islands S. E. of the coast of Lesbos, a province of Asia Minor. In the vicinity of these islands the Athenians, under Conon, 406 B. C., defeated the Spartans under Collicratidos in a hard contested naval battle.

ARGIVES, or **ARGIGI**, the inhabitants of Argos; used by Homer and other ancient authors as a generic appellation for all the Greeks.

ARGOL, a salt deposited by wine on the inside of the bottles and barrels. It is dissolved more easily in water than in alcohol. It is mostly composed of potassic bitartrate, $KHC_4H_4O_6$, and contains varying quantities of calcic of tartrate, mucilaginous matter, and coloring. It may be purified in hot water, and clarified by adding clay, and recrystallizing. In repeating the process it becomes white and is called cream of tartar.

ARGOLIS (ar'gō-lis), a peninsula of Greece; lies between the bays of Nauplia and Ægina, and now forms, with Corinth, a nomarchy or department. Argolis was the eastern region of Peloponnesus. The Greeks inhabiting it were often called Argives, or Argians. Hills and mountains alternate with fruitful plains and valleys. Here reigned Pelops, an emigrant from Asia Minor, from whom the peninsula derives its name. It was afterward the seat of government of Atreus and Agamemnon, Adrastus, Eurystheus, and Diomedes. Here, Hercules was born. In the morass of Argolis he slew the Lernæan hydra, and in the cave of Nemea subdued the ferocious lion. In the earliest times it was divided into the small kingdoms of Argos, Mycenæ, Tirinthus, Trœzene, Hermione, and Epidaurus, which afterward formed free states. The chief city, Argos, has retained its name since 1800 B. C. Pop. about 9,000. Here, and in Delphi, statues were erected to the brothers Biton and Cleobis, who fell victims to their filial piety. Near this city lies the capital of Argolis, Nauplia, or Napoli di Romania. On the site of the present village of Castri, on the Ægean Sea, formerly lay the city Hermione, with a grove dedicated to the Graces: opposite is the island of Hydra. Near the city of Epidaurus, the watering place of ancient Greece, on the Ægean Sea, Æsculapius had his temple. At Trœzene, now the village of Damala, Theseus was born. Pop. of province of Argolis and Corinth about 160,000.

ARGON, a constituent gaseous element discovered in our atmosphere by Lord Rayleigh and Prof. Ramsay, in 1894. Argon has a characteristic spectrum. Its specific gravity (H=1) is between 19 and 21. It is about 2½ times as soluble in water as nitrogen. Its critical temperature (—121°C.) and boiling point (—187°C.) are lower than those of oxygen. It seems to be incapable of combining with anything. It has been found in cleveite and in a meteorite. There is still much doubt concerning its true status. It is separated by acting on air with red-hot copper filings to separate the oxygen. The residual gas is dried and passed over white-hot magnesium filings. The magnesium combines with the nitrogen, producing a solid nitride and leaving argon as a gas.

ARGONAUT (ar'gō-nât), one of the heroes who accompanied Jason in the ship "Argo" when he sailed on his mythic voyage in quest of the golden fleece. (Generally used in the plural, Argonauts).

The word is also applied to a genus of cephalopod mollusks, the typical one of the family *argonautidæ*. The best known species is the argonaut, or paper sailor.

ARGO-NAVIS, the southern constellation of the Ship, containing 9 clusters, 3 nebulæ, 13 double and 540 single stars, of which about 64 are visible.

ARGONNE (ar-gōn') a district of France, between the rivers Meuse, Marne, and Aisne, celebrated for the campaign of Dumouriez against the Prussians in 1792, and for the military movements and actions which took place therein previous to the battle of Sedan, in 1870.

In the World War it was the scene of many struggles between the Germans and Allied forces. On Sept. 26, 1918, the First American Army began a great offensive movement west through the Argonne forest, advancing six miles on a 30-mile front, and capturing many towns and thousands of Germans. See MEUSE-ARGONNE, BATTLES OF.

ARGOS, a town of Greece, in the N. E. of the Peloponnesus, between the gulfs of Ægina and Nauplia or Argos. This town and the surrounding territory of Argolis were famous from the legendary period of the Greek history onward, the territory containing, besides Argos, Mycenæ, where Agamemnon ruled, with a kind of sovereignty, over all the Peloponnesus.

ARGOSY, a poetical name for a large merchant vessel; derived from Ragusa, a port which was formerly more celebrated than now.

ARGOT, the jargon, slang, or peculiar phraseology of a class or profession; originally the conventional slang of thieves and vagabonds, invented for the purpose of disguise and concealment.

ARGUIM, or **ARGUIN** (ar-gwim' or ar-gwin'), a small island on the W. coast of Africa, not far from Cape Blanco, formerly a center of trade the profession of which was violently disputed between the Portuguese, Dutch, English, and French, and is now claimed by France.

ARGUS. (1) In classical mythology, a son of Arestor, said to have had 100 eyes, of which only two slept at one time, the several pairs doing so in succession. When killed by Mercury his eyes were put into the tail of a peacock, by direction of Juno, to whom this bird was sacred. Argus was deemed a highly ap-

propriate name to give to a vigilant watch dog.

(2) In zoölogy, a genus of birds of the family *phasianidæ*, and the sub-family *phasianinæ*. It contains the argus, or argus pheasant (*argus giganteus*). The male measures between five and six feet from the tip of the bill to the extremity of the tail, and is an eminently beautiful bird, the quill-feathers of the wings, which often exceed three feet in length, being ornamented all along by a series of ocellated spots. The name Shetland argus is given to a starfish (*astrophyton scutatum*). It is called also the basket urchin or sea basket.

ARGYLL, CAMPBELLS OF, a historic Scottish family, raised to the peerage in the person of Sir Duncan Campbell of Lochow, in 1445. The more eminent members are: ARCHIBALD, second Earl, killed at the battle of Flodden, 1513. ARCHIBALD, fifth Earl, attached himself to the party of Mary of Guise, and was the means of averting a collision between the Reformers and the French troops in 1559; died 1575. ARCHIBALD, eighth Earl and Marquis, born 1598; a zealous partisan of the Covenanters. It was by his persuasion that Charles II. visited Scotland, and was crowned at Scone in 1651. At the Restoration he was committed to the Tower, and beheaded in 1661. ARCHIBALD, ninth Earl, son of the preceding, served the King with great bravery at the battle of Dunbar, and was excluded from the general pardon by Cromwell in 1654. On the passing of the Test Act in 1681 he refused to take the required oath. For this he was tried and sentenced to death. He, however, escaped to Holland, from whence he returned with a view of aiding the Duke of Monmouth. His plan, however, failed, and he was taken and conveyed to Edinburgh, where he was beheaded in 1685. ARCHIBALD, tenth Earl and first Duke, son of the preceding, died 1703; took an active part in the Revolution of 1688-1689, which placed William and Mary on the throne, and was rewarded by several important appointments and the title of Duke. JOHN, second Duke and Duke of Greenwich, son of the above, born 1678, died 1743; served under Marlborough at the battles of Ramilies, Oudenarde, and Malplaquet, and assisted at the sieges of Lille and Ghent. He incurred considerable odium in his own country for his efforts in promoting the union. In 1712 he had the military command in Scotland, and, in 1715, he fought with the Earl of Mar's army at Sheriffmuir, near Dunblane, and forced the Pretender to quit the kingdom. GEORGE DOUGLASS CAMPBELL, eighth Duke, Baron Sundridge and Hamilton, was born in 1823. He early took a part in politics, especially in discussions regarding the Presbyterian Church of Scotland. In 1852 he became Lord Privy Seal under Lord Aberdeen, and again under Lord Palmerston, in 1859; Postmaster-General in 1860; Secretary for India from 1868 to 1874; again Lord Privy Seal in 1880, but retired, being unable to agree with his colleagues on their Irish policy. He was author of "The Reign of Law," "Scotland as It Was and as It Is," etc. He died April 24, 1900. His eldest son, as MARQUIS OF LORNE, married the Princess Louise, fourth daughter of Queen Victoria, in 1871. He succeeded as ninth duke in 1900, and died in 1914.

ARGYLLSHIRE, a county in the west midland division of Scotland. It has an area of 3,232 square miles, of which over 600 are islands. It has an extensive coast line amounting to 2,300 miles. Sheep grazing is the principal industry. The land does not lend itself generally to agriculture. Mining and quarrying are carried on to some extent. The capital is Inverary. Other important towns are Campbelton, Oban, and Tarbert. Pop. about 70,000.

ARIADNE (ar-ē-ad'ne), a daughter of Minos, King of Crete, who, falling in love with Theseus, then shut up by her father in the labyrinth, gave him a clue by which he threaded his way out. Afterward she was the wife of Bacchus, who gave her a crown, which ultimately became a constellation called by her name. Also an asteroid, the 43d found; discovered by Pogson, on April 15, 1857.

ARIAN, a follower of Arius, Presbyter of Alexandria in the 4th century A. D., or one holding the system of doctrine associated with his name. During the first three centuries of the Christian era, what was subsequently called the doctrine of the Trinity had become the subject of controversy, chiefly in one direction; it had been decided against Sabellius that there are in the Godhead three distinct persons, whereas Sabellius had in effect reduced the three to one. In the year 317, Alexander, Bishop of Alexandria, having publicly expressed his opinion that the Son of God is not only of the same dignity as the Father, but of the same essence (in Greek, *ousia*), Arius, one of the Presbyters, considered this view as leaning too much to Sabellianism, and, rushing to the other extreme, he declared that the Son of God was only the first and noblest of created beings, and though the universe had been brought into existence through His instrumentality by the

Eternal Father, He was inferior, not merely in dignity, but in essence. The views of Arius commended themselves to multitudes, while they were abhorrent to still more; fierce controversy respecting them broke out, and the whole Christian world was soon compelled to take sides in the struggle. Constantine, the first Christian emperor, then the reigning sovereign, summoned a council to meet at Nice, in Bithynia, which it did in A. D. 325. It was the first general council and the most celebrated of all. It declared Christ to be *homoousios, i, e.*, of the same essence as the Father, whereas Arius regarded Him as only *homoiousios*, of similar essence. The erring Presbyter was deposed and exiled. The Arians greatly weakened themselves by splitting into sects, and the doctrines regarding the relations of the three Divine Personages authoritatively proclaimed at Nice were at last all but universally adopted.

ARICA, a seaport of Tacna, the most southerly department of Peru. It is one of the chief outlets of the trade of Bolivia, and has been connected since 1854, by rail, with Tacna, 38 miles inland. Its exports mostly consist of copper, silver, cascarilla and other barks, chinchilla skins, alpaca, and vicuna wool. Arica has frequently suffered from earthquakes. It was almost wholly destroyed in 1832, but soon rebuilt. It suffered severely again in 1868, the earthquake being succeeded by fearful waves, one of them 40 feet high. In the time of the Spanish supremacy, Arica was a great commercial city with 30,000 inhabitants; its present population is about 5,000. It was stormed and taken by the Chileans in 1880. For details of the long-standing dispute between Chile and Peru for the possession of Arica and Tacna see CHILE and PERU.

ARIÈGE (ar-yāzh), a mountainous department of France, on the slopes of the Pyrenees, comprising the ancient countship of Foix and parts of Languedoc and Gascony. The principal rivers are the Ariège, Arize, and Salat, tributaries of the Garonne. Sheep and cattle are reared; the arable land is small in quantity. Chief town, Foix. Area 1,890 square miles; pop. about 200,000.

ARIEL, the name of several personages mentioned in the Old Testament; in the demonology of the later Jews a spirit of the waters. In Shakespeare's "Tempest," Ariel was the "tricksy spirit" whom Prospero had in his service.

ARIES, in astronomy, the constellation Aries, or the Ram, one of the ancient zodiacal constellations, and generally called the first sign of the zodiac; also the portion of the ecliptic between 0° and 30° longitude, which the sun enters on March 21st (the vernal equinox). The constellation Aries, from which the region derives its name, was once within its limits, but now, by the precession of the equinoxes, it has gradually moved into the space anciently assigned to Taurus. It is denoted by the Greek symbol, *Gamma*, which remotely resembles a ram's head.

The first point of Aries is the spot in the heavens where the sun appears to stand at the vernal equinox. It is not marked by the presence of any star, but it is not very far from the third star of Pegasus, that called Algenib. It is the point from which the right ascensions of the heavenly bodies are reckoned upon the equator and their longitudes upon the ecliptic.

ARIL, or **ARILLUS**, in some plants, as in the nutmeg, an extra covering of the seed, outside of the true seed coats. It is either succulent or cartilaginous, colored, elastic, rough or knotted. In the nutmeg it is known as mace.

ARIMATHÆA (ar-ē-ma-thē'a), a town of Palestine, identified with the modern Ramleh, 22 miles W. N. W. of Jerusalem.

ARION, an ancient Greek poet and musician, born at Methymna, in Lesbos, flourished about B. C. 625. He lived at the court of Periander of Corinth, and afterward visited Sicily and Italy. Returning from Tarentum to Corinth with rich treasures, the avaricious sailors resolved to murder him. Apollo, however, having informed him in a dream of the impending danger, Arion in vain endeavored to soften the hearts of the crew by the power of his music. He then threw himself into the sea, when one of a shoal of dolphins, which had been attracted by his music, received him on his back and bore him to land. The sailors having returned to Corinth, were confronted by Arion, and convicted of their crime. The lyre of Arion, and the dolphin which rescued him, became constellations in the heavens. A fragment of a hymn to Poseidon, ascribed to Arion, is extant.

ARIOSTO, LUDOVICO (ä-rē-ōs'tō), an Italian poet, born at Reggio, Sept. 8, 1474. Was one of the three great epic poets of Italy, and styled "The Divine." He abandoned law for the study of the classics, and was introduced with diplomatic missions by Cardinal d'Este, and his brother, Duke of Ferrara. Ariosto's

fame rests mainly on his great romantic heroic poem "Orlando Furioso." It is really a continuation of Bojardo's "Orlando Inamorato." Of his other poetical efforts the most noteworthy are his seven epistolary satires, conceived in the spirit of Horace, which contain sundry bits of autobiographical information and rank among the treasures of Italian literature. He died at Ferrara, June 6, 1533.

ARISTÆUS (ar-is-tē'us), son of Apollo and Cyrene, was brought up by the Nymphs. The introduction of the use of bees is ascribed to him (hence he is called Melliscœus), and gained for him divine honors.

ARISTARCHUS (ar-is-tar'kus), a Greek grammarian, who criticized Homer's poems with the greatest severity, and established a new text; for which reason severe and just critics are often called Aristarchi. He was born in the island of Samothrace, and lived at Alexandria, about 750 B. C. He died at Cyprus, aged 72.

ARISTIDES (a-ris-tī'dēz), a statesman of ancient Greece, for his strict integrity surnamed "The Just." He was one of the 10 generals of the Athenians when they fought with the Persians at Marathon B. C. 490. Next year he was eponymous archon, and enjoyed such popularity that he excited the jealousy of Themistocles, who procured his banishment about 483. When Xerxes invaded Greece with a large army, the Athenians hastened to recall him, and Themistocles now admitted him to his confidence and councils. In the battle of Platæa (479) he commanded the Athenians, and had a great share in gaining the victory. He died at an advanced age about B. C. 468, so poor that he was buried at the public expense.

ARISTIPPUS (ar-is-tip'us), a disciple of Socrates, and founder of a philosophical school among the Greeks, which was called the Cyrenaic, from his native city Cyrene, in Africa; flourished in 380 B. C. His moral philosophy differed widely from that of Socrates, and was a science of refined voluptuousness. His fundamental principles were—that all human sensations may be reduced to two, pleasure and pain. Pleasure is a gentle, and pain a violent emotion. All living beings seek the former, and avoid the latter. Happiness is nothing but a continued pleasure, composed of separate gratifications; and as it is the object of all human exertions, we should abstain from no kind of pleasure. Still we should always be governed by taste and reason in our enjoyments. His doctrines were taught only by his daughter Arete, and by his grandson Aristippus the younger, by whom they were systematized. Other Cyrenaics compounded them into a particular doctrine of pleasure, and are hence called Hedonici. The time of his death is unknown. His writings are lost.

ARISTOBULUS (ar-is-tō-bū'lus), name of several royal personages of Judea: ARISTOBULUS I., son of John Hyrcanus, high priest of the Jews; from 105-104 B. C. King of Judea. He is supposed to have been the first of the Hasmoneans to take the title of king. In the single year of his reign he conquered portions of Iturea and Trachonitis, and compelled the people to accept Judaism. ARISTOBULUS II., son of Alexander Jannæus, was named as high priest by his mother, Queen Regent Alexandra, while to Hyrcanus II., his elder brother, the throne was given. In a contest for the throne, he was defeated by Pompey in 63 B. C., and carried captive to Rome. He died about 30 B. C. ARISTOBULUS III. was the grandson of Hyrcanus II.; his sister, Mariamne, was the wife of Herod I., who appointed him high priest, but, fearing his popularity, had him assassinated about 30 B. C. ARISTOBULUS III. was the last male of the Hasmonean family.

ARISTOCRACY, a form of government by which the wealthy and noble, or any small privileged class, rules over the rest of the citizens; now mostly applied to the nobility or chief persons in a state.

ARISTOGEITON (-gī'ton), a citizen of Athens, whose name is rendered famous by a conspiracy (514 B. C.) formed in conjunction with his friend Harmodius against the tyrants Hippias and Hipparchus, the sons of Pisistratus. Both Aristogeiton and Harmodius lost their lives through their attempts to free the country and were reckoned martyrs of liberty.

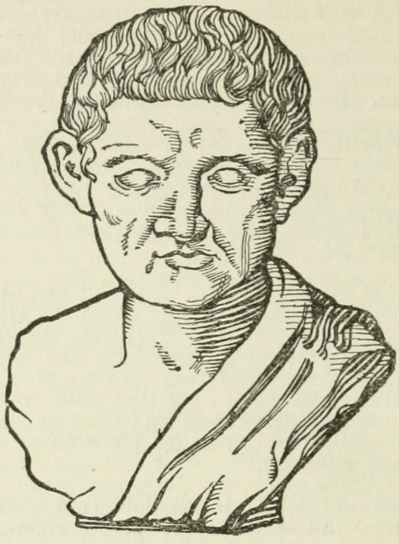
ARISTOLOCHIA (-lō'kē-a), a genus of plants, the typical one of the order *aristolochiaceæ*, or birthworts. They have curiously inflated irregular flowers, in some cases of large size. One species, the *A. clematis*, or common birthwort, a plant with pale yellow tubular flowers, swollen at the base, is common among old ruins. Most of the aristolochias are emmenagogue, especially the European species, *A. rotunda, longa,* and *clematitis,* and the Indian *A. Indica;* the last-named species is also antarthritic. *A. bracteata* is anthelmintic; when bruised and mixed with castor-oil, it is used in cases of ob-

stinate psora. *A. odoratissima*, of the West Indies, is alexipharmic. The *A. fragrantissima*, of Peru, is given in dysenteries, fevers, rheumatism, etc.; *A. serpentaria* (the Virginian snake root), besides being given in the worst forms of typhus fever, is deemed of use against snake-bite; as is also *A. trilobata*.

ARISTOLOCHIACEÆ (ar-is-tō-lō-kē-a'sē-ī), an order of plants placed by Lindley under his last or asaral alliance of perigynous exogens. It has hermaphrodite flowers, six to ten epigynous stamina, a three or six celled inferior ovary and wood without concentric zones. There are about 130 species. Many are climbing plants. In their qualities they are tonic and stimulating.

ARISTOPHANES (ar-is-tof'ē-nēs), the greatest of the Greek writers of comedy (B. C. 448-385), born at Athens. His comedy, "The Knights," is said to have been put on the stage when the author was but 20 years old. Of his 44 plays only 11 have come down to us. These are "The Knights," "The Clouds," "The Wasps," "The Acharnians," "The Peace," and "The Lyristrate," arguments for concord among Grecian states; "The Birds," a satire against the "Greater Athens" idea; "The Thesmophoriazusæ"; "The Frogs," directed against Euripides, as the cause of the degeneration of dramatic art; in "The Ecclesiazusæ," or "Ladies of Parliament," he reduces to absurdity the overweening expectation of the righting of all wrongs through political reforms. Aristophanes first appeared as a poet in the fourth year of the Peloponnesian War (B. C. 427), and his sarcasms twice brought him to trial on charges of having unlawfully assumed the title of an Athenian citizen.

ARISTOTLE (ar'is-totl), the most renowned of Greek philosophers, born at Stagira, Macedonia, 384 B. C.; was for 20 years a student of philosophy in the school of Plato at Athens, but at the same time a teacher. After Plato's death, he opened a school of philosophy at the court of Hermias, King of Atarneus, in Mysia, whose adopted daughter he afterward married. At the invitation of Philip of Macedon, he undertook the education of his son, Alexander. When Alexander succeeded to the throne, the philosopher returned to Athens and opened a school in the Lyceum. From being held in the covered walk (*peripatos*) of the Lyceum, the school obtained the name of the Peripatetic. The number of his separate treatises is given by Diogenes Laertius as 146; only 46 separate works bearing the name of the philosopher have come down to our time. He died at Chalcis, Eubœa, in the year 322 B. C.



ARISTOTLE

ARISTOTELIANISM, or **PERIPATETICISM**, the doctrine of philosophy of Aristotle. Aristotle attempted to steer a medium course between the ultraidealism of his master Plato, and the low sensationalism of the physical school of Elea. His genius was as wide as nature. He keenly combated the ideal theory of Plato, or that which expounded the deity as holding in himself the archetypal ideas after which the world was fashioned, and which it was the business of reason and science to discover. But while denying these ideas of his master, he nevertheless agreed with him in the view that knowledge contains an element radically distinct from sensation. He also differed from the Eleatics and the Epicureans, inasmuch as he denied that sensation could account for the whole of knowledge; but maintained, with them, that without this sensation, knowledge would be impossible. The celebrated maxim that "there is nothing in the intellect which was not previously in the sense," if not Aristotle's, at least well expresses a side of his doctrine; but, when he insists upon the distinction between the necessary and the contingent, the absolute and the relative, he rises altogether above the sphere of sensation, and takes emphatically his place with reason. Philosophy, according to Aristotle, is properly science arising from the love of knowledge. There are

two sorts of knowledge: mediate, and immediate. From immediate knowledge, which we gain through the experience of particulars, we derive mediate knowledge, by means of argumentation, whose theory it is the office of logic to properly expound. Logic is, therefore, the instrument of all science; but only *quoad formam*, for it is experience which supplies the matter to be worked upon. The formal part of reasoning he accordingly expounds better than any man either before or since his time. He, indeed, created logic, and this system stands erect through the changes of centuries. He most profoundly bases his logic upon the laws of contradiction, and he even recognizes that of sufficient reason as a regulative principle in the evolution of truth. After logic, he took up all the sciences, rational, empirical, and mixed, except one alone, viz., history.

He seems to have divided philosophy into logic, physics, and ethics, or into speculative and practical knowledge. (1) Speculative philosophy contemplates the real order of things, irrespective of human control; practical philosophy discusses affairs voluntary and accidental. Real substances are either invariable, or variable; while sublunary matters are variable, and perishable; the deity alone is imperishable, and unchangeable. Do men pursue the real in an abstract way? Then, metaphysics and mathematics emerge. Do they pursue knowledge as to its objects? Then physics, cosmology, psychology, theology emerge. (2) Practical philosophy again comprehends ethics, politics, and economy. A word or two on each of these heads; and first of speculative philosophy.

1. Physics, or natural philosophy. Nature is the sum of all existences, which are disclosed to us by our perceptive faculties. The knowledge of nature is properly the knowledge of the laws of bodies in motion. Nature, cause, accident, end, change, infinitude, space, time, and motion, are included in this science. In his "Cosmology," Aristotle discusses astronomy, using that term in its widest signification. It appears to us moderns obscure and inconsistent, and is by no means satisfactory. Physiology is indebted to Aristotle for its first essay. The soul is, according to him, the active principle of organized life. It is distinct from the body, yet, considered as its form or entelechy, it is inseparable from it. Its faculties are production, nutrition, sensation, thought, and will or impulse.

2. The ruling idea of his practical philosophy was that of a sovereign good, and final end or aim of action. This final end he denominated happiness, which is the result of the perfect energies of the soul, and is the highest of which our nature is capable. It arises from the perfect exercise of reason, and is ordinarily called virtue. This he describes as the mean between two extremes, which is the character of nearly the whole of his philosophy. He distinguishes the moral virtues into seven cardinal ones, of which justice, in a sense, embraces all the rest. Under the head of right, he distinguishes that belonging to a family from that belonging to a city. A perfect unity of plan prevails throughout his morals, politics and economics. Both of the latter have for their object to show how this perfect virtue, already described, may be attained in the civil and domestic relationships, through a good constitution of the state and the household. The principle of the science of politics is expediency, and its perfection consists of suitableness of means to the end proposed. By this principle Aristotle proves the legality of slavery; and all education he refers to the ultimate end of political society.

ARISTOXENUS (ar-is-tox'ē-nus), an ancient Greek musician and philosopher of Tarentum, born about B. C. 324. He studied music under his father Mnesias, and philosophy under Aristotle, whose successor he aspired to be. He endeavored to apply his musical knowledge to philosophy, and especially to the science of mind. We have a work on the "Elements of Harmony" by him.

ARITHMETIC. Viewed as a science, arithmetic is a branch of mathematics; looked on as an art, its object is to carry out for practical purposes certain rules regarding numbers, without troubling itself to investigate the foundation on which those rules are based.

It is variously divided, as into integral and fractional arithmetic, the former treating of integers and the latter of fractions. Integral arithmetic is sometimes called vulgar or common arithmetic; and from fractional arithmetic is sometimes separated decimal arithmetic, treating, as the name implies, of decimals. There are also logarithmic arithmetic for computation by logarithms, and instrumental arithmetic for calculation by means of instruments or machines. Another division is into theoretical arithmetic, treating of the science of numbers, and practical arithmetic, which points out the best method of practically working questions or sums. Political arithmetic is arithmetic applied to political economy, as is done in the statistical re-

turns so continually presented to Parliament or Congress. Finally, universal arithmetic is a name sometimes applied to algebra. The chief subjects generally treated under the science or art of arithmetic are: (1) numeration and notation; (2) addition; (3) subtraction; (4) multiplication; (5) division; (6) reduction; (7) compound addition; (8) compound subtraction; (9) compound multiplication; (10) compound division; (11) simple proportion (rule of three); (12) compound proportion; (13) vulgar fractions; (14) decimal fractions; (15) duodecimals; (16) involution; (17) evolution; (18) ratios, proportions, and progressions; (19) fellowship or partnership; (20) simple interest; (21) compound interest, and (22) position. Of these, the most important are the simple processes of addition, subtraction, multiplication and division, the judicious use of which, singly or in combination, will solve the most complex arithmetical questions.

ARITHMETICAL COMPLEMENT, that which a number wants to make it reach the next highest decimal denomination. Thus the arithmetical complement of 4 is 6, for $4 + 6$ are $= 10$, and that of 642 is 358, because $642 + 358$ are $= 1{,}000$. The arithmetical complement of a logarithm is what it wants to make it reach 10.

ARITHMETICAL MEAN. (1) The number, whether it be an integer or a fraction, which is exactly intermediate between two others. Thus, 5 is the arithmetical mean between 2 and 8; for $2 + 3$ are $= 5$, and $5 + 3$ are $= 8$. To find such a mean add the numbers together and divide their sum by 2; thus, $2+8=10$, and $10\div2=5$. (2) Any one of several numbers in an arithmetical ratio interposed between two other numbers. Thus, if 6, 9 and 12 be interposed between 3 and 15, any one of them may be called an arithmetical mean between these two numbers.

ARITHMETICAL PROGRESSION, a series of numbers increasing or diminishing uniformly by the same number. If they increase, the arithmetical progression is said to be ascending, and if they decrease, descending. Thus the series 3, 6, 9, 12, 15 is an ascending arithmetical progression, mounting up by the continued addition of 3; and the series 8, 6, 4, 2 is a descending one, falling regularly by 2.

ARITHMETICAL PROPORTION, the relation existing between four numbers, of which the first is as much greater or less than the second as the third is of the fourth; the equality of two differences or arithmetical ratios. In such cases the sum of the extremes is=that of the means.

ARI THORGILSSON (ä-rē tōr'gils-son), the father of Icelandic literature (1067-1148). He was the first Icelander to use his mother tongue as a literary medium in writing his "Islendingabók," a concise history of Iceland from its settlement (about 870) until 1120. This work was finished between 1134 and 1138.

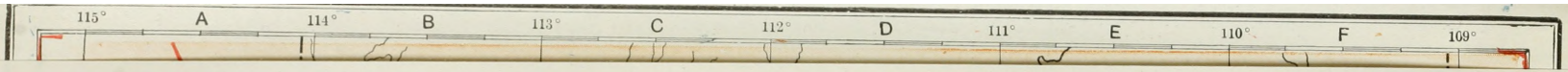
ARIUS, the founder of Arianism. See ARIAN.

ARIZONA, a State of the Western Division of the North American Union, bounded by Nevada, Utah, New Mexico, California and the Mexican State of Sonora; gross area, 113,870 square miles; organized Feb. 14, 1863; pop., (1900) 122,931; (1910) 204,354; (1920) 334,162. Capital, Phœnix.

Topography.—The surface in general is a series of plateaus, ranging in altitude from 80 to 7,500 feet above sea-level. It is traversed by the Northside, San Francisco, Black, Black Mesa, Gila, Dragon, Santa Ana, Zuni, Santa Catarina, Mogollon and Penaleno Mountains, with peaks stretching to an extreme height of 12,572 feet (Humphrey Peak). The watercourses are the Colorado river and its tributaries, the Little Colorado, Gila, Zuni, San Juan, and several smaller streams. The principal rivers pass through cañons that are among the greatest wonders of the world. Dotting the plains are enormous mesas or tablelands, some with perpendicular sides more than 1,000 feet high. No part of the world has so rich a field of archæological and ethnological investigation as Arizona. Long-buried dwellings and cities, with other ruins of an exceedingly ancient people, are being continually disclosed.

Geology.—The weird cañons are remarkable in that they exhibit all the geological formations of North America. Geologists declare that the Colorado river, in its whole course, has cut through strata representing a thickness of 25,000 feet, and exposed the gradations from the quarternary alluvial deposits through volcanic alterations to the primary azoic rocks. The Grand Cañon of the Colorado alone shows upper carboniferous limestone, cross-stratified sandstone, red calcareous sandstone with gypsum, lower carboniferous limestone, shales, grits, Potsdam sandstone and granite and other formations.

Mineral Production.—Arizona is one of the most important of the mineral producing States. Its most important


115°
A
114°
B
113°
C
112°
D
111°
E
110°
F
109°


ARIZONA
SCALE OF STATUTE MILES
0 10 20 30 40 50 60 70 80
SCALE OF KILOMETERS
0 20 40 60 80 100 120 140
County Towns
Railroads
L. L. POATES, ENGR'G CO., N.Y.
Longitude 112° West from 111° Greenwich
Copyright, L. L. Poates Engr. Co., 1921

mineral products are copper, gold, silver, and lead. It also has valuable deposits of zinc, coal, nickel, graphite, tungsten, and other metals. The copper production has increased steadily in recent years. The smelter output in 1918 was 769,522,729 pounds, compared with 719,034,514 pounds in 1917. In the production of copper, Arizona far exceeds any other State. The gold production in 1918 was 278,647 fine ounces, valued at $5,760,200; the silver production was 6,771,490 fine ounces, valued at $6,771,490. The zinc production exceeds in value $2,000,000 annually. The value of the lead produced is also in excess of $2,000,000. Gold production in 1919 was valued at $5,716,200. The total value of the mineral products of the State in 1917 was $212,615,978.

Soil.—Of the total area, embracing over 72,500,000 acres, only a comparatively small portion, approximating 5,000,000 acres, is arable land, and of this part about 500,000 acres are under irrigation and highly productive. The construction of irrigating canals and water storage reservoirs is daily adding largely to the agricultural area. The pine timber land covers an area of nearly 4,000,000 acres.

Agriculture.—The principal crops are wheat and hay. Within recent years much attention has been given to the cultivation of sugar beets, date palms, melons, cotton, tobacco, sugar-cane, and the canaigre plant, used in tanning. Almonds, peanuts, oranges, lemons, apricots, potatoes, corn, barley, oats, and root products generally do well under irrigation. The production and value of the principal crops in 1919 were as follows: Corn, 1,287,000 bushels, valued at $2,574,000; oats, 533,000 bushels, valued at $533,000; barley, 1,102,000 bushels, valued at $1,543,000; wheat, 1,204,000 bushels, valued at $2,709,000; hay, 676,000 tons, valued at $13,520,000; cotton, 75,000 bales, valued at $19,125,000.

Manufactures. — Natural conditions have made Arizona more of a mining and agricultural region than a manufacturing one. The chief productions were flour, grist, and lumber in various forms. In 1914 there were in the State 322 manufacturing establishments, employing 6,898 wage earners. The capital invested was $40,300,000; wages paid amounted to $6,229,000; value of materials used was $39,283,000; and the value of the finished product was valued at $64,090,000.

Education.—The school population in 1919 was about 78,000. There were enrolled in the grammar schools 63,714 pupils and in the high schools, 4,504. The daily attendance in the grammar schools was 38,139 and in the high schools, 3,220. There were 1,702 teachers in the public schools. The total expenditure for education purposes in 1919 was $2,973,339. For higher instruction there were public high schools at Phœnix and Prescott, St. Joseph's Academy at Prescott, a public normal school at Tempe, and the University of Arizona at Tucson, opened in 1891. Schools for Indian youth are maintained at the Colorado river, Fort Apache, Navajo and San Carlos agencies, and at Phœnix, Sacaton, Supai, Hualapai, and Hackberry.

Churches.—The strongest denominations numerically are the Roman Catholic; Latter-Day Saints; Methodist Episcopal, South; Baptist; Presbyterian; Protestant Episcopal; and Congregational.

Railroads.—The railway mileage is about 2,500. About 30 miles of new track were constructed in 1919.

Finances.—The total receipts for the fiscal year 1919 were $7,089,715, and the disbursements $5,760,454. There was a balance at the end of the year of $1,329,260. The total bonded indebtedness of the State, including county and city indebtedness, in 1919 was $2,996,275.

Government.—Arizona became a State as a result of the passage in Jan. 20, 1910, of an Enabling Act which authorized the election of delegates for the constitutional convention. This election was held on September 12, 1910. The Convention was in session from Oct. 15 to Dec. 10, 1910. The constitution prepared by this body was extremely radical, including the recall of judges, initiative and referendum, and other provisions of a like nature. It was ratified on Feb. 7, 1911, by a vote of 12,000 to 7,500. Congress, as a result of action on the part of President Taft, passed a resolution providing for the admission of Arizona as a State if the provision for the recall of judges should be eliminated from the Constitution. This action was eliminated on Dec. 12, 1911. The proclamation formally admitting Arizona to the Union as a State was signed on Feb. 14, 1912. At the first election held on Dec. 12, 1911, officers and members to Congress were elected. Democrats elected all the officers. An amendment providing for woman suffrage was carried at this election as well as an amendment to the constitution restoring the provision for the recall of judges. The Legislature is composed of 19 members of the Senate and 35 members of the House. There is one representative in Congress. The Governor is elected for a term of four years.

History.—The country now included in

Arizona and New Mexico was partly explored in 1539 by Marco de Nizan, in quest of the precious metals, and on his report Vasquez de Coronado organized an expedition in the following year and visited the Moqui villages and the New Mexican pueblos. About 1596 the first colony was established; in 1680 the Spaniards were driven out of the country; by 1695 they had recovered nearly all of it, and by 1720 Jesuit missionaries had established a number of missions, ranches and mining stations. There were serious Indian outbreaks in 1802 and 1827, and what is now Arizona and New Mexico was acquired by the United States by treaties in 1848 and 1853.

ARIZONA, UNIVERSITY OF, a co-educational institution in Tucson, organized in 1891, reported at the end of 1919: Professors and instructors, 90; students, 968; volumes in the library, 32,000; grounds and buildings valued at $85,000; productive funds, $10,500; income, $700,000; president, Rufus B. Von Kleinsmid, Ph. D.

ARJISH DAGH (ar'yēsh-dach'), the loftiest peak of the peninsula of Asia Minor, at the western extremity of the Anti-Taurus Range, 13,150 feet; an exhausted volcano; on the N. and N. E. slopes are extensive glaciers.

ARK, a chest or coffer for the safe-keeping of any valuable thing; a depository. The large floating vessel in which Noah and his family were preserved during the deluge.

The Ark of the Covenant, in the synagogue of the Jews, was the chest or vessel in which the tables of the law were preserved. This was a small chest or coffer, three feet nine inches in length, two feet three inches in breadth and the same in height, in which were contained the various sacred articles. It was made of shittim wood, overlaid within and without with gold and was covered with the mercy seat, called also the propitiatory, as the Septuagint expresses it, that is, the lid or cover of propitiation; because, in the typical language of Scripture, those sins which are forgiven are said to be covered.

ARKANSAS, a State in the South Central Division of the North American Union; bounded by Missouri, Tennessee, Mississippi, Louisiana, Texas, and Oklahoma; gross area, 53,850 square miles; admitted into the Union, June 15, 1836; seceded, March 4, 1861; readmitted, June 22, 1868; number of counties, 75; pop. (1890) 1,128,179; (1900) 1,311,564; (1910) 1,574,449; (1920) 1,752,204. Capital, Little Rock.

Topography. — The surface presents the features of mountains, prairies, hills, valleys and swamps. The Ozark, Boston, Ouachita and other ranges, from 1,500 to 2,000 feet high, occupy the W. and N. W. parts, with numerous spurs and outlying hills of considerable altitude; the central part is rolling ground; and the E. part is low, with many lakes and swamps and is liable to overflows of the Mississippi. Drainage is by the Mississippi, Arkansas, St. Francis, Black, White, Ouachita, Saline and Red rivers. Compensation for the absence of a sea-coast is had in the navigability of long stretches of the principal rivers, thus permitting a valuable water traffic with adjoining States.

Geology.—The upper mountainous, forest and mineral lands may be separated from the lowlands and alluvial plains by a line drawn across the State from N. E. to S. W. The principal formations are the lower silurian in the N.; the sub-carboniferous on the S.; the cretaceous in the S. W., and the tertiary, overlaid by quarternary sands and clays. Hot and mineral springs are numerous and some of them are widely known. The valley of the St. Francis in the N. E. is a continuous swamp covered with a heavy growth of cypress, gum, oak, hickory and sycamore, while in the higher land there is an abundance of white oak and hickory. In the Arkansas valley are red cedar, cottonwood, maple and several varieties of oak. Other forest growths of value are ash, walnut, elm, willow, and papaw.

Mineralogy.—The State contains semi-anthracite, cannel, and bituminous coal; iron and zinc ores; galena, frequently bearing silver; manganese; gypsum, oil-stone of superior quality; marble; alabaster; rock crystal; copper; granite; kaolin; marl; mineral ochers, and salt. The State is an important producer of coal and of bauxite, the mineral from which aluminum is extracted. Other minerals produced in considerable quantities are lime, manganese, natural gas, lead, and zinc. The coal production in 1917 was 2,228,000 long tons. The production of zinc is valued at $1,500,000 annually. The total value of the mineral products in 1917 was $12,061,702.

Soil.—The soil varies with the geological characteristics and surface conditions already described. Agriculturally, the most valuable soil is found in the river bottom-lands, and as the surface rises from these bottoms the soil becomes less productive. There are large submerged tracts that only require proper drainage to make them valuable to the farmer. The uplands generally are well timbered and well watered.

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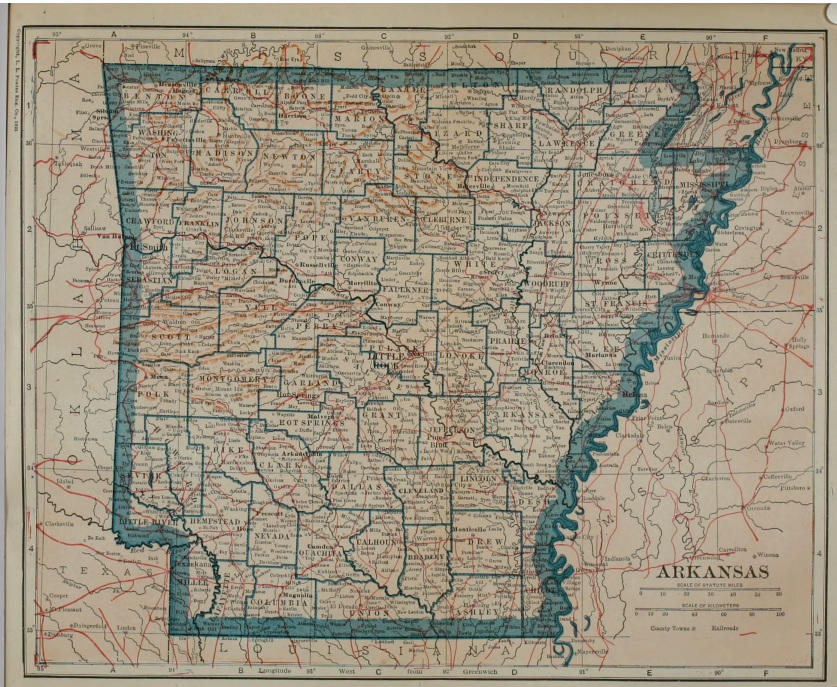
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ARKANSAS
SCALE OF STATUTE MILES
SCALE OF KILOMETRES
County Towns ⊙ Railroads
Longitude 93° West from Greenwich
MISSOURI
MISSISSIPPI
OKLAHOMA
TEXAS
LOUISIANA
TENNESSEE
CARROLL
BENTON
WASHINGTON
MADISON
CRAWFORD
FRANKLIN
JOHNSON
POPE
LOGAN
SEBASTIAN
SCOTT
MONTGOMERY
POLK
GARLAND
HOT SPRINGS
PIKE
CLARK
HEMPSTEAD
LITTLE RIVER
NEVADA
OUACHITA
CALHOUN
COLUMBIA
UNION
BRADLEY
CLEVELAND
DESHA
DREW
LINCOLN
JEFFERSON
ARKANSAS
GRANT
SALINE
CONWAY
VAN BUREN
FAULKNER
PERRY
YELL
MARION
BAXTER
BOONE
NEWTON
SEARCY
STONE
IZARD
SHARP
FULTON
RANDOLPH
LAWRENCE
GREENE
CRAIGHEAD
POINSETT
CROSS
WOODRUFF
WHITE
PRAIRIE
LONOKE
PULASKI
MONROE
LEE
PHILLIPS
CRITTENDEN
INDEPENDENCE
JACKSON
WOODRUFF

Agriculture.—The production and the value of the principal crops in 1919 were as follows: Corn, 48,726,000 bushels, valued at $79,911,000; oats, 9,240,000 bushels, valued at $8,131,000; wheat, 3,230,000 bushels, valued at $6,525,000; rice, 6,162,000 bushels, valued at $14,789,000; hay, 770,000 tons, valued at $15,785,000; cotton, 830,000 bales, valued at $151,060,000; potatoes, 3,321,000 bushels, valued at $6,808,000; sweet potatoes, 4,600,000 bushels, valued at $5,201,000. Of farm and ranch animals the most numerous are swine and cattle.

Manufactures.—There were in 1914 2,604 manufacturing establishments, with 41,979 wage earners. The capital invested was $77,162,000; the amount paid in wages, $20,752,000; the value of materials used, $44,907,000; and the value of finished product, $83,940,000.

Banking.—In 1919 there were 78 National banks in operation, having $5,557,000 in capital and $3,437,220 in outstanding circulation. There were also 386 State banks, with $14,062,000 in capital, $101,896,000 in deposits, and $145,181,000 in resources.

Education.—Conditions have never been favorable in Arkansas for educational development owing to the large percentage of negro population. There is a compulsory education law, but several counties are exempted from its provisions. Enrollment in the public schools is about 450,000 and the average daily attendance about 300,000. There are about 11,000 teachers. The expenditure for public schools is between $4,000,000 and $5,000,000 annually. In 1917 the Legislature passed measures providing for aid for the establishment of rural high schools.

The principal universities and colleges are Arkansas College, Hendrix College, Ouachita College, Arkansas Cumberland College, UNIVERSITY OF ARKANSAS (*q. v.*).

Churches.—The strongest denominations numerically in the State are the Methodist Episcopal, South; Regular Baptist, Colored; Regular Baptist, South; African Methodist Episcopal; Disciples of Christ; and the Methodist Episcopal.

Railroads.—The total railway mileage of the State is 5,400. There has been little new construction in recent years.

Finances.—The assessed realty valuation in 1919 was $359,436,376. The State debt was $2,008,166. The internal revenue receipts amounted to $7,515,009.

State Government.—The Governor is elected for a term of two years. Legislative sessions are held biennially, and are limited to 60 days each. The Legislature has 35 members in the Senate and 100 in the House. There are 7 representatives in Congress. In politics the State is strongly Democratic.

History.—This portion of the original Territory of Louisiana, named after a tribe of Indians found there by the earliest explorers of record, was first settled by the French in 1670. It became a part of Louisiana Territory in 1803, of Missouri Territory in 1812; was organized as Arkansas Territory, with the present Indian Territory and Oklahoma Territory in 1819; and was detached from Indian Territory and created a State in 1836. It was settled almost exclusively by people from the Southern States, and early became a battle ground in the Civil War. Following the seizure of Federal arsenals by the State authorities after the State had seceded, came the defeat of the Confederates in the battle at Pea Ridge, May 6-7, 1862, and in that of Prairie Grove, or Fayetteville, Dec. 7 following; the occupation by the Union forces of Helena; and the capture of Arkansas Post by a combined Union military and naval force, Jan. 11, 1863, and of Little Rock, Sept. 10, following. The State was under military control in 1864-1868 and adopted its present Constitution in 1874.

ARKANSAS CITY, a city of Kansas, in Cowley co. It is on the Atchison, Topeka and Santa Fé, the Missouri Pacific, the Kansas Southwestern, the Midland Valley, and the St. Louis and San Francisco railroads. The city has an Indian school, a training college, a library, and other public buildings. A canal connecting the Arkansas and Walnut rivers furnishes water power for manufacturing. It is the center of an important agricultural and stock-raising community, and also has manufactures of lumber, carriages, and creamery products. Pop. (1910) 7,518; (1920) 11,253.

ARKANSAS RIVER, a tributary of the Mississippi, rising in central Colorado and flowing E. into Kansas. It then flows S. E. across Oklahoma and diagonally across Arkansas. It is about 2,000 miles long, and is navigable to Wichita, Kan., a distance of about 650 miles.

ARKANSAS, UNIVERSITY OF, a coeducational institution organized in 1872, with academic and technical departments in Fayetteville, law and medical departments in Little Rock, and normal school for colored students in Pine Bluff; reported at the end of 1919: Professors and instructors, 90; students, 720; president, John Clinton Farrell.

ARKONA, the N. E. promontory of the island of Rügen, in the Baltic.

ARKWRIGHT, SIR RICHARD, an English inventor, born at Preston, in Lancashire, in 1732. The youngest of 13 children, he was bred to the trade of a barber. When about 35 years of age he gave himself up exclusively to the subject of inventions for spinning cotton. The thread spun by Hargreaves' jenny could not be used except as weft, being destitute of the firmness or hardness required in the longitudinal threads or warp. But Arkwright supplied this deficiency by the invention of the spinning frame, which spins a vast number of threads of any degree of fineness and hardness, leaving the operator merely to feed the machine with the cotton and to join the threads when they happen to break. His invention introduced the system of spinning by rollers, the carding, or roving, as it is technically termed (that is, the soft, loose strip of cotton), passing through one pair of rollers, and being received by a second pair, which are made to revolve with (as the case may be) three, four, or five times the velocity of the first pair. By this contrivance the roving is drawn out into a thread of the desired degree of tenuity and hardness. Having taken as partners two men of means, Arkwright erected his first mill at Nottingham and took out a patent for spinning by rollers in 1769. As the mode of working the machinery by horse power was found too expensive, he built a second factory on a much larger scale at Cromford, in Derbyshire, in 1771, the machinery of which was turned by a water-wheel. Having made several additional discoveries and improvements, he took out a fresh patent for the whole in 1775, and thus completed a series of the most ingenious and complicated machinery. Notwithstanding a series of lawsuits in defense of his patent rights, and the destruction of his property by mobs, he amassed a large fortune. He was knighted by George III., in 1786, and died in 1792.

ARLES (ärl), a city of France, in the department of Bouches-du-Rhone, on the Rhone, 44 miles W. N. W. of Marseilles. It is principally notable as having been an important town when Gaul was invaded by Cæsar. It afterward became a Roman colony, and was long a rich and prosperous city. The Roman amphitheater, capable of accommodating 30,000 spectators, yet remains noble in its ruins. The great obelisk, and innumerable artistic remains, attest the former magnificence of this city. The Emperor Constantine embellished Arles, and his son Constantine II. was born here. In 855 it became the capital of the Arletan kingdom, which was, in 933, united to that of Burgundy. Pop. about 17,500.

ARLINGTON, a town of Massachusetts in Middlesex co., on the Boston and Maine railroad. It is about 6 miles N. W. of Boston and is practically a suburb of that city. It has important manufactures of piano cases and machinery. Truck farming is also carried on extensively. The town has a public library, hospital, and other public buildings. It was settled in 1650. Pop. (1910) 11,187; (1920) 18,665.

ARLINGTON HEIGHTS, a range of hills in Fairfax co., Va., on the Potomac, opposite Washington. They were strongly fortified during the Civil War. Gen. Robert E. Lee had a residence here. The place is now the site of a National Soldiers' Cemetery.

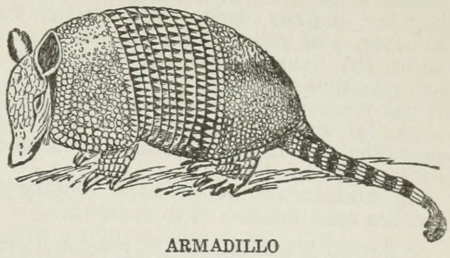
ARLISS, GEORGE, an English actor, born in London in 1868. He was educated in that city and made his first appearance on the stage in 1887. In 1901 he toured America with Mrs. Patrick Campbell, and in the following year played with Blanche Bates. He was later leading man for Mrs. Fiske. He made a great success in the title rôles of "The Devil" and of "Disraeli." He was successful also in the play "Hamilton," 1917.

ARM, the upper limb in man, connected with the thorax or chest by means of the scapula or shoulder-blade, and the clavicle or collar-bone. It consists of three bones, the arm-bone (humerus), and the two bones of the fore-arm (radius and ulna), and it is connected with the bones of the hand by the carpus or wrist. The head or upper end of the arm-bone fits into the hollow called the glenoid cavity of the scapula, so as to form a joint of the ball-and-socket kind, allowing great freedom of movement to the limb. The lower end of the humerus is broadened out by a projection on both the outer and inner sides (the outer and inner condyles), and has a pulley-like surface for articulating with the fore-arm to form the elbow-joint. This joint somewhat resembles a hinge, allowing of movement only in one direction. The ulna is the inner of the two bones of the fore-arm. It is largest at the upper end, where it has two processes, the coronoid and the olecranon, with a deep groove between to receive the humerus. The radius—the outer of the two bones—is small at the upper and

expanded at the lower end, where it forms part of the wrist-joint. The muscles of the upper arm are either flexors or extensors, the former serving to bend the arm, the latter to straighten it by means of the elbow-joint. The main flexor is the biceps, the large muscle which may be seen standing out in front of the arm when a weight is raised. The chief opposing muscle of the biceps is the triceps. The muscles of the fore-arm are, besides flexors and extensors, pronators and supinators, the former turning the hand palm downward, the latter turning it upward. The same fundamental plan of structure exists in the limbs of all vertebrate animals.

ARMADA, a fleet of armed ships; a squadron; particularly applied to that great naval armament, which was called the Invincible Armada, fitted out in 1588, by Philip II., against Queen Elizabeth. It consisted of 129 ships, carrying about 20,000 soldiers and 8,000 sailors. The loss of the Marquis of Santa Cruz, their admiral, and a violent tempest, the day after they sailed, retarded for some time the operations of the Spaniards. They arrived on the coast of the Netherlands in July, were thrown into disorder by a stratagem of Lord Howard, and in this situation were attacked with such impetuosity that it became necessary to attempt to return. Contrary winds obliged the Spanish admiral, the Duke of Medina Sidonia, to make the circuit of Great Britain with the wreck of this magnificent armament. In passing the Orkneys, it was attacked by a violent storm, and only a feeble remnant returned to Spain.

ARMADILLO, the Spanish-American name now imported into English, of various mammalia belonging to the order *edentata*, the family *dasypodidæ*, and its typical genus dasypus. The name armadillo, implying that they are in armor, is applied to these animals because the upper part of their body is covered with large, strong scales or plates, forming a helmet for their head, a buckler for their shoulders, transverse bands for their back, and in some species a series of rings for the protection of their tail. The fore feet are admirably adapted for digging, and the animal, when it sees danger, can extemporize a hole and vanish into it with wonderful rapidity. If actually captured, it rolls itself into a ball, withdrawing its head and feet under its strong armor. There are several species —such as the great armadillo, or tatu (*dasypus gigas*), the three-banded armadillo, or apara (*D. apar*), the six-banded armadillo (*D. sexcinctus*), and the hairy armadillo (*D. villosus*). They feed chiefly on ants and other insects



ARMADILLO

and worms, and are peculiar to South America.

It is also the name of a genus of crustaceans belonging to the order *isopoda*, and the family *oniscidæ*, the type of which is the well-known wood-louse. It is so called partly from its being covered with a certain feeble kind of armor; but chiefly from its rolling itself up into a ball after the fashion of the South American mammalian armadillos.

ARMAGEDDON (-ged'don), the great battlefield of the Old Testament, where the chief conflicts took place between the Israelites and their enemies—the tableland of Esdraelon in Galilee and Samaria, in the center of which stood the town Megiddo, on the site of the modern Lejjun; used figuratively in the Apocalypse to signify the place of "the battle of the great day of God."

ARMAGH (är-mä'), a city, and capital of Armagh co., Ireland; and the archiepiscopal seat of the Primate of all Ireland; 70 miles N. W. of Dublin. It is said to have been founded by St. Patrick, A. D. 450. Pop. about 7,000.

ARMATURE, armor worn for the defense of the body, or, more frequently, the armor in which some animals are enveloped for their protection against their natural foes.

In magnetism, the armatures, called also the keepers, of a magnetic bar are pieces of soft iron placed in contact with its poles. These, by being acted on inductively, become magnets, and, reacting in their turn, not merely preserve, but even increase, the magnetism of the original bar. Magnets thus provided are said to be armed. Sometimes an armature is made of steel and is permanently magnetized. Such an armature is termed a polarized armature, and is used in various appliances, magneto generators, telegraphic instruments, etc. In dynamic electricity, the armature is the shaft or central revolving arm of an

electric generator, by the movement of which the current is generated.

In electricity (a) the internal and external armatures, or coatings of a Leyden jar, and the coatings of tinfoil on its interior, and part of its exterior, surface; (b) Siemens' armature or bobbin, an armature designed for magneto-electrical machines, in which the insulated wire is wound longitudinally on the core, instead of transversely, as is the ordinary arrangement.

In architecture, iron bars, employed for the consolidation of a building.

ARMED NEUTRALITY, the condition of affairs when a nation assumes a threatening position, and maintains an armed force to repel any aggression on the part of belligerent nations between which it is neutral. This condition prevailed between the United States and Germany for several weeks in 1917, prior to the declaration of war on April 6.

ARMENIA, a mountainous country of western Asia, of great historical interest, as the original seat of one of the oldest civilized peoples in the world. It was shared until the World War of 1914-1918 between Turkey, Persia, and Russia. It has an area of about 137,000 square miles, and is intersected by the Euphrates, which divides it into the ancient divisions, Armenia Major and Armenia Minor.

Topography.—The country is an elevated plateau, inclosed on several sides by the ranges of Taurus and Anti-Taurus, and partly occupied by other mountains, the loftiest of which is Ararat. Several important rivers take their rise in Armenia, namely, the Kur or Cyrus, and its tributary the Aras or Araxes, flowing E. to the Caspian Sea; the Halys or Kizil-Irmak, flowing N. to the Black Sea; and the Tigris and Euphrates, which flow into the Persian Gulf. The chief lakes are Van and Urumiyah. The climate is rather severe. The soil is on the whole productive, though in many places it would be quite barren were it not for the great care taken to irrigate it. Wheat, barley, tobacco, hemp, grapes, and cotton are raised; and in some of the valleys apricots, peaches, mulberries, and walnuts are grown.

People.—The inhabitants are chiefly of the genuine Armenian stock, a branch of the Aryan or Indo-European race. The total number of Armenians is estimated at 3,000,000. Almost one half of these, previous to the World War, lived in Transcaucasia, about 650,000 in Turkish Armenia, about 500,000 in what was formerly European Turkey, about 600,000 in Asiatic Turkey outside of Armenia, about 100,000 in Persia, and about 15,000 in Hungaria, Transylvania and Galicia. In the last 15 years Armenian emigration to the United States has been considerable, almost 10,000 coming in in 1913, the year before the World War. Thirty-nine times the Armenians by force of arms have won the independence of their country, only to lose it again. During the period the Turks were in control of the country everything possible was done to destroy the military spirit of the people. The Armenians were not allowed to bear arms, being compelled instead to pay a tax or indemnity to the Turks. This was only one of the many taxes levied upon them, the total reaching a large and almost crushing amount. In the collection of these taxes the Turks were cruelly ingenious.

Language.—The Armenian language belongs to the Indo-European family of languages, and is most closely connected with the Iranic group. The old Armenian or Haikan language, which is still the literary and ecclesiastical language, is distinguished from the new Armenian, the ordinary spoken language, which contains a large intermixture of Persian and Turkish elements.

Religious Belief.—The Armenians received Christianity as early as the 2d century. During the Monophysitic disputes they held with those who rejected the twofold nature of Christ, and, being dissatisfied with the decisions of the Council of Chalcedon (451), they separated from the Greek Church in 536. The Popes have at different times attempted to gain them over to the Roman Catholic faith. There are small numbers here and there of United Armenians, who acknowledge the spiritual supremacy of the Pope, agree in their doctrines with the Catholics, but retain their peculiar ceremonies and discipline. But the far greater part are yet Monophysites, and have remained faithful to their old religion and worship. Their doctrine differs from the orthodox chiefly in their admitting only one nature in Christ, and believing the Holy Spirit to proceed from the Father alone.

History.—Little is known of the early history of Armenia, but it was a separate state as early as the 8th century B. C., when it became subject to Assyria, as it also did subsequently to the Medes and the Persians. It was conquered by Alexander the Great in 325 B. C., but regained its independence about 190 B. C. Its King Tigranes, son-in-law of the celebrated Mithridates, was defeated by the Romans under Lucullus and Pompey

about 69-66 B. C., but was left on the throne. Since then its fortunes have been various under the Romans, Parthians, Byzantine emperors, Persians, Saracens, Turks, etc. A considerable portion of it was acquired by Russia in the 19th century, part of this in 1878.

Within recent years thousands of Armenians have been massacred or have perished of starvation. In 1894-1896 they suffered terrible atrocities in the Sasun district. The Great Powers forced the Sultan to accept a scheme of reforms. In spite of the Sultan's acquiescence the atrocities broke out afresh in 1895, and lasted till the spring of 1896. In the autumn of 1896 the persecutions recommenced and terrible massacres occurred at Harpoot and Egin. It is estimated that over 80,000 people perished in the various outbreaks. In Harpoot the fury of the mob seemed to be directed against the American and English mission stations. Several American missionaries were killed. See ARMENIAN MASSACRES.

After Turkey entered the European War of 1914-1918, a systematic extermination of the Armenian people was started. The American Committee for Armenian Relief reported in 1916 that between 600,000 and 850,000 Armenians were killed or perished from privations.

In 1920 the Great Powers in the League of Nations offered the United States the mandate of the Armenian Republic, but it was declined. See ARMENIAN REPUBLIC.

ARMENIAN MASSACRES. Shortly after the oubreak of the war Turkish so-called "patriotic" societies began to send threatening letters to the Armenian press in Constantinople. Bands of Turkish "nationalists" were at this time going nightly through the Armenian quarter of Constantinople making threats of death upon the doors of houses, churches and schools. Shortly after the Young Turk Government made a definite attempt to win the Armenians over to the side of the Central Powers, whose cause they had espoused; but one leading authority at least believes that even then their ultimate destruction had been determined upon—was indeed a foregone conclusion with so good a pretext as the outbreak of a general war. The Young Turks started their oppression of the Armenians of Turkey by "requisitioning" their property recklessly, and by sending exclusive battalions to the most exposed French and British fronts. The Turks now felt that they had a free course. The restraining hand of Europe was no longer upon them. Indeed they had the countenance of Germany, whom they believed to be invincible. The Armenians as a people were in many cases armed and the government's first step was to make them defenseless. The program they decided upon was to murder all the Armenian soldiery everywhere at one blow—at the same time to decoy and murder the Armenian leaders—and finally to fall on the population. In less than a year the program had been carried out to the eternal shame of the Ottoman Government and the horror of civilization. The Armenians of Turkey to the number of about a million, old and young, rich and poor, and of both sexes, had been collectively drowned, burned, bayonetted, starved, bastinadoed or otherwise tortured to death, or else deported on foot penniless and without food, to the burning Arabian deserts.

Lord Bryce in his report to the House of Lords, Oct. 6, 1915, said: "The whole Armenian population of each town or village was cleaned out by a house-to-house search. Every inmate was driven into the street. Some of the men were thrown into prison, where they were put to death, sometimes with torture; the rest of the men with the women and children were marched out of the town. When they had got some little distance they were separated, the men being taken to some place among the hills where the soldiers, or the Kurdish tribes who were called to help in the work of slaughter, despatched them by shooting or bayoneting; the women or children, and old men were sent off under convoy of the lowest kind of soldiers — many of them just drawn from gaols, to their distant destination which was sometimes one of the unhealthy districts in the center of Asia Minor, but more frequently the large desert in the province of Der-El-Lor, which lies east of Aleppo, in the direction of Euphrates. They were driven along by the soldiers day after day, all on foot, beaten or left behind to perish if they could not keep up with the caravan; many fell by the way, and many died of hunger. No provisions were given them by the Turkish Government, and they had already been robbed of everything they possessed. Not a few of the women were stripped naked and made to travel in that condition beneath a burning sun. Some of the mothers went mad, and threw away their children, being unable to carry them further. The caravan route was marked by a line of corpses, and comparatively few seem to have arrived at their destination—chosen, no doubt, because return was impossible and because there was little prospect that any would survive their hardships." Before the deportations be-

gan, many Armenian women were seized by Turkish officers and officials for their harems. Others were sold in the slave-market to Moslem purchasers only. Boys and girls in large numbers were also sold as slaves, sometimes for as low as two or three dollars. Other boys were delivered to the dervishes to be made Mussulmans. Some idea of the thorough and remorseless fashion of carrying out the massacres may be obtained from the instance of Trebizond. Here the Armenian residents were hunted out from house to house and driven in a great crowd down the streets to the sea. Here they were all put aboard sailing-boats, carried out into deep water and thrown overboard and drowned. Almost the entire population of Trebizond, numbering nearly 10,000 souls, was wiped out. Absolutely fiendish methods were employed on occasion. At Kouroukhan, in the search for arms, one man was shod like a horse, and another done to death by placing a red-hot iron crown on his head. The treatment of the women was unspeakable. At Sivas, the terminus of the Anatolian railway to Erzerum, the soldiers like famished wolves consumed everything they found, and they outraged every woman they saw. In the last week of June and early in July the massacres began on a large scale throughout the province. All the male adult population were led away from their women and herded together into camps or prisons, and then massacred in small batches in some neighboring valley. At Mattepe, an hour's ride east of Sivas, 20 Armenian officials in the Government service were hacked to pieces. At Hubash, east of Sivas, 3,800 Armenians of the neighborhood were pole-axed, bayonetted, or stoned in blood-curdling circumstances. At Cotni, a village containing 120 Armenian families, bands of criminals just released from prison gloried in the exploit of having killed every male above twelve, and outraged every female above the same age. The women of Malatia were stripped naked, and amid the jibes and jeers of the rabble were led on their way into the Mesopotamian desert. Many of these unfortunate women actually went mad; others employed painful means to end their lives. Throughout the province of Sivas 150,000 Armenians were killed or deported—the latter being equivalent to massacre, as hardly any escaped death by starvation.

From May to October of 1915, the Turkish Government steadily pursued its program of extermination. A general order for deportation of every Armenian to Mesopotamia was sent to every province in Asia Minor, and no exceptions were made for the aged, the ill or even women in pregnancy. Only the rich and the best-looking women and girls were allowed the opportunity to accept Islamism—and very few of them did so.

The time given to depart was two to six hours, and nothing but food and bedding was to be taken along, and only so much as each person could carry. The journey consumed from three to eight weeks, and very few survived it.

When they passed through Christian villages where the deportation order had not yet been received, the travelers were not allowed to receive food or ministrations of any sort. The sick and the aged and the children fell by the roadside and did not rise again.

In the neighborhood of two hundred thousand of the Armenian population managed to escape to the Caucasian borders and took refuge under the standard of Russia.

Lord Bryce estimated that four-fifths of the entire nation had been wiped out, and added, "there is no case in history, certainly not since the time of Tamerlane, in which any crime so hideous and upon so large a scale has been recorded. The Armenian atrocities have been called 'the blackest page of modern history.'"

A final report of the Armenian and Syrian Relief Committee, published at the close of the year 1915, showed thousands dying in the concentration camps along the Euphrates chiefly of starvation.

ARMENIAN REPUBLIC. The Turkish peace treaty handed to the Ottoman delegates in Paris May 11, 1920, had as one of its conditions the recognition by Turkey of Armenia as a free and independent state. It was also stipulated that Turkey should consent to accept the arbitration of President Wilson as to the frontier in the provinces of Erzerum, Trebizond, Van, and Bitlis, and to the access of Armenia to the sea. The de facto existence of the Armenian Republic had already been recognized by the Supreme Council of the Allies, in January, 1920, and by the United States in April of the same year. The Republic, whose existence had been self-proclaimed in May, 1918, is governed by a Parliament and by a Cabinet of six ministers, one of whom acts as Minister-President. The latter post was held in 1920 by Al Khatissian, who had been formerly Mayor of Tiflis under Russian control.

ARMENTIÈRES, a town of the department Nord, France, on the river Lys, near the Belgian frontier and about ten miles west-northwest of the great manu-

facturing center of Lille. Its population previous to the outbreak of the World War was 28,620. It had important industries in woolen cloth, linen, calicoes, lace, thread, sugar, and tobacco. Brick-making was extensively carried on. Armentières was occupied by the Germans in the course of their first invasion in 1914, and all through the conflict it was in the zone of the fighting. It was the scene of terrific conflicts during the retreat of the British in the great German drive in the spring of 1918. When at length the tide of battle turned and the Germans were driven back in defeat, the town was a desolate and ghastly ruin.

ARMIES OF THE WORLD. The condition of the great powers following the World War wrought an entirely different status in the composition and formation of their armies. While there was a strong effort to incorporate in the covenant of the League of Nations provisions providing for practical disarmament, it was found impossible to bring about this result, and the victorious nations were left practically free to raise and equip armies, although the general principle was enunciated that the League had some sort of control which would prevent the creation of armies beyond the size required for national protection.

The composition and organization of the army of the United States is described under the title MILITARY ORGANIZATION OF THE UNITED STATES. Following the close of hostilities the army of Great Britain was demobilized until it reached about 1,200,000 men, which included about 200,000 volunteer regulars. These were distributed in Germany, India, and in the various British possessions. Following the ratification of peace, the army of the Rhine was reduced from ten to two divisions. The total reductions were about 600,000. The regular army of Great Britain was then composed of about 250,000 men. It was stated by British war officials that the size of the army would remain practically the same as before the beginning of the World War.

By the terms of the Treaty of Peace, the strength of the German army was established at a maximum of 100,000 men. Disturbances in Germany, however, in 1919 and 1920 called for a much larger military establishment. This was made up of various reserve forces, some of which were used as police in the various cities. It was estimated on Jan. 1, 1920, that the German armed forces amounted to nearly 1,000,000 men, composed of 400,000 regulars, 12,000 troops of the navy, 50,000 armed constabulary, from 150,000 to 200,000 temporary volunteers, and from 300,000 to 400,000 civic guards. See GERMANY.

While universal service was still maintained in France following the World War, its burdens were considerably lifted. It was proposed to reduce the army to a strength of 350,000 men, of whom 200,000 were men doing compulsory service, 50,000 long-service men, 50,000 colonial troops, and 50,000 commissioned and non-commissioned officers. Conditions in Germany and in other parts of Europe made it impossible to carry out this plan in 1920, so that a much larger force was maintained during that year than was provided for by these plans.

From the conditions in Russia prevailing in 1919 and 1920 it was impossible to arrive at any satisfactory estimate as to the size or composition of its armies. In Austria the army had practically ceased to exist. In the other countries of Europe the unsettled conditions made it necessary to maintain comparatively large armies. This was especially true in Poland, where active hostilities were carried on with Russia, and, in Italy, where disturbances threatened on account of the difficulties in settling the boundaries.

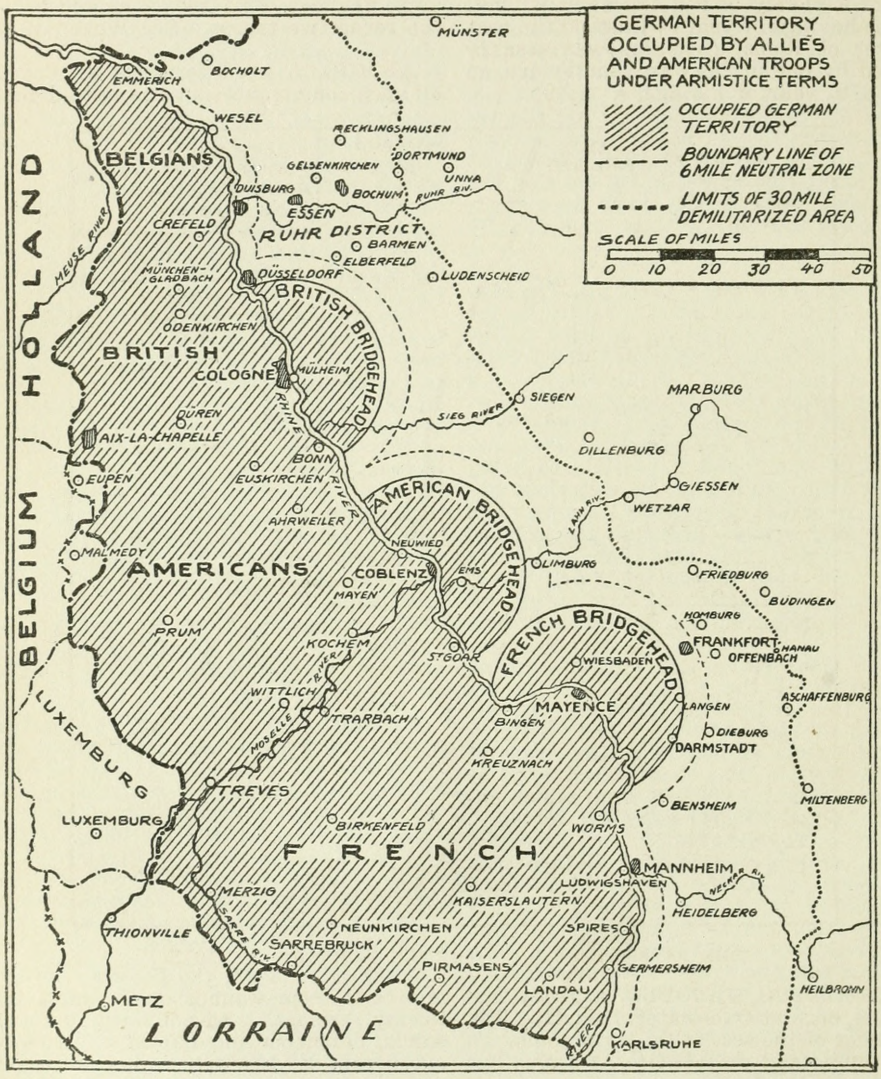
The composition and strength of the armies in the other important countries of the world will be found in the articles on those countries.

ARMILLARY SPHERE, an astronomical instrument consisting of an arrangement of rings, all circles of one sphere, intended to represent the principal circles of the celestial globe, the rings standing for the meridian of the station, the ecliptic, the tropics, the Arctic and the Antarctic circles, etc., in their relative positions. Its main use is to give a representation of the apparent motions of the solar system.

ARMINIANISM, the doctrine of Arminius, a Protestant divine, who maintained that God had predestinated the salvation or condemnation of individuals only from having foreseen who would and who would not accept of offered mercy. After the death of Arminius his followers rapidly increased, and were vehemently attacked by the Calvinists. In 1610, they addressed a petition to the states of Holland for protection, from which they got the name of Remonstrants. The Calvinists put forth a counter remonstrance, and, in 1614, the states issued an edict granting full toleration to both parties. This displeased the Calvinists, who continued their per-

secutions, and at length, in 1619, the doctrines of the Arminians were condemned by the Synod of Dort, and their clergy were driven from their churches, and forbidden the exercise of their min-

dwindled to a small body, but their tenets, especially regarding predestination, have been adopted by various other denominations, as the Wesleyan Methodists.



OCCUPATION OF GERMANY UNDER TERMS OF THE ARMISTICE

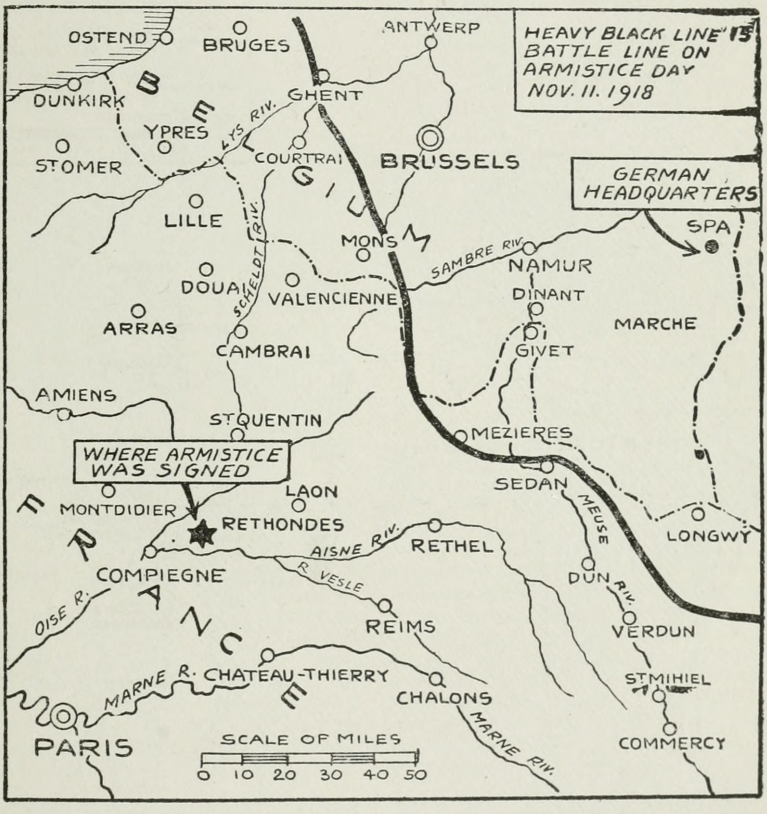
istry in public. Owing to this step, many left the country, and found refuge in France, England, and other places. After 1630 the Arminians were again tolerated in Holland; but from that time, their opinions underwent a considerable change. They chiefly build on the necessity of moral duties and good works, and allow each one to interpret the Holy Scriptures for himself. The Arminians

ARMINIUS, or **HERMANN**, who by his intrepidity and success acquired the title of "the Deliverer of Germany," was son of Segimer, a chief of Cherusci. Having been sent to Rome as a hostage, he was there educated, served in the Roman army and for his valor was raised to citizenship and knighted. But his attachment to his native country induced him to revolt and he became one

of the most powerful leaders of the discontented German nations. He drew Varus, the Roman commander on the Rhine, into that ambuscade in which he and nearly all his troops were slain, and completely baffled Germanicus; but, after having for years withstood the vast power of Rome, Arminius was assassinated by one of his own countrymen, in the 37th year of his age, A. D. 19.

tween two countries, the latter, limited to particular places, as between two armies or between a besieged fortress and its assailants. The former ordinarily requires ratification, but the latter is in the power of the commanders of the respective troops. See WORLD WAR.

ARMOR, a word formerly applied to all such contrivances as served to defend



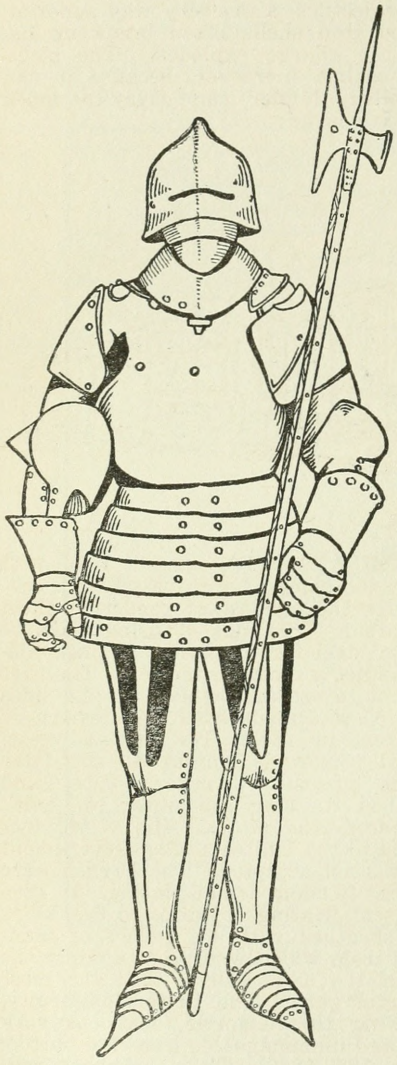
THE BATTLE LINE ON ARMISTICE DAY, NOV. 11, 1918.

ARMINIUS, JACOBUS, a Protestant divine, born at Oudewater, Holland, 1560, founder of the sect of the Arminians. In his public and private life Arminius has been admired for his moderation. A life of perpetual labor and vexation of mind shortened his days and he died in 1609.

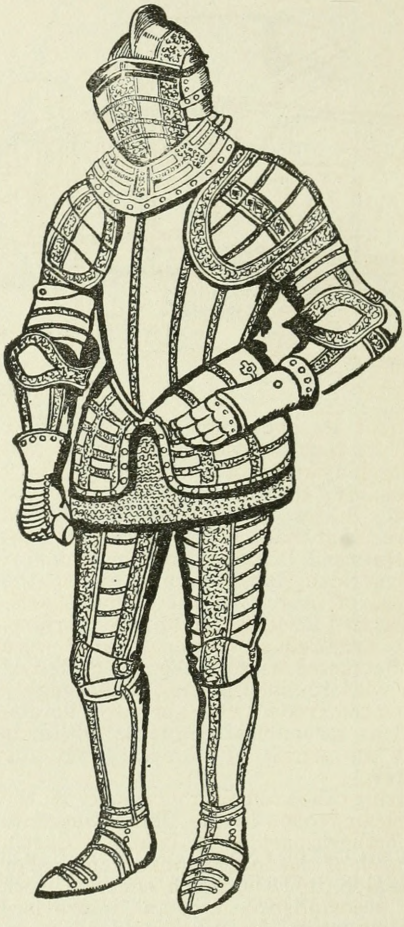
ARMISTICE, the term given to a truce or suspension of hostilities between two armies or nations at war, by mutual consent. It sometimes occurs owing to the exhaustion of both parties; at other times it is had recourse to with a view to arrange terms of peace. It may be either general or partial; the former, be-

the body from wounds or to annoy the enemy. Hence it was divided into two kinds, defensive and offensive. A complete suit of defensive armor anciently consisted of a casque or helm, a gorget, cuirass, gauntlets, tasses, brassets, cuishes and covers for the legs, to which the spurs were fastened. This was called armor *cap-a-pie*, and was worn by cavaliers and men-at-arms. The infantry had only part of it, viz., a pot or head-piece, a cuirass and tasses; all of them made light. The horses had armor which covered the head and neck. Of all this equipment of war scarcely anything is now retained except, in a

few cases, the cuirass. One of the few picturesque features of the World War was the revival of the use of armor in other protective devices of metal.



ITALIAN ARMOR, 1460



ENGLISH ARMOR OF THE 16TH CENTURY

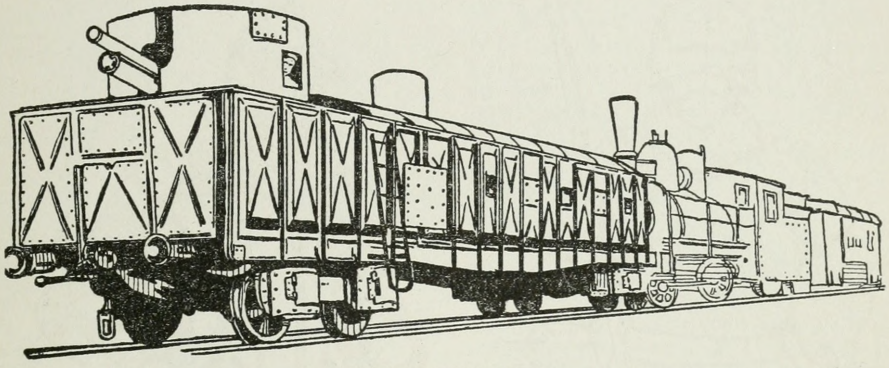
The word is applied to the metal protection given to ships of war, usually the employment of steel helmets, and consisting of super-carbonized steel or nickel steel. See ARMOR PLATES.

ARMORED TRAIN, one of the modern instruments of war. Credit has been given to Admiral Fisher of the British navy for the first use of the armored train in war, when, in 1882, he covered a locomotive with boiler plate and equipped cars, similarly protected, with field guns and put them to effective practical use. But the germ of the idea goes back further than 1882. When the Germans closed their vise-like grip upon Paris, the French made frequent sorties from the city, and in many of these attacks the guns were mounted on railroad cars protected at vital points by steel plates. Great Britain employed armored trains in the Boer War which served as a model for all others that followed.

The protected engine carries a Maxim gun, and the protected cars have heavy field guns, operated by machinery, so that any part of the surrounding country can quickly be covered. Arrangements are made to compensate for the recoil, and also to give steadiness and

stability to the cars. This latter is accomplished by an arrangement for clamping the truck to the rails by strong screw clips whenever the gun is fired. There are also several steel-plated vans accompanying the train, in which horses and soldiers can be safely conveyed.

The rapidity with which the train can change its base of action renders it a difficult object for the batteries of an enemy to hit, and almost the only way to defeat its operations is to wreck or derail it; then it becomes a helpless target for long-range guns.



ARMORED TRAIN

Probably the first attempt in the United States to provide an armored car was that made by the Michigan Central Railroad Company, on the order of the American Express Company, for the purpose of protecting the valuable articles carried on its special express trains. These armored or "arsenal cars" were so constructed as to make the center of them with its steel plating a thoroughly bullet-proof room, with apertures so disposed as to enable the guards within to resist an attack by thieves from any quarter.

During the remarkable dash of the American troops in the Philippines into the northern part of the island of Luzon, in search of the fugitive insurgent leader Aguinaldo, in 1899, much effective work was accomplished by an improvised armored train. In the World War armored trains were used on a limited scale.

ARMOR-PIERCING SHELLS, projectiles so constructed as to bore through the metallic plates with which modern ships of war are coated. It has been stated as an axiom that any armor-plate which may be carried on a ship may be penetrated. A Kruppized plate, eight inches thick, resisted a shell striking it with a velocity of 2,300 feet a second, but a capped ball moving at the rate of 2,500 feet pierced it. A Harveyized plate has been pierced to the depth of 14 inches by a six-inch projectile.

Steel, though costlier than chilled iron, for projectiles is in every way superior. Chilled iron shells often break up before the charge explodes. The steel-shell casing, moreover, because it can be rolled thinner, can carry a much heavier charge.

ARMOR PLATES, slabs of metal with which the sides of war vessels are covered for the purpose of rendering them shot-proof. The idea of using slabs of iron or steel for protection against missiles is not a recent invention. The first attempt to use armor-plate on the sides of ships was made by John Stevens, of Hoboken, in 1812. He built a vessel shaped somewhat similar to the later vessels of the "Monitor" type, and sheathed it along the water line with laminated iron plates. His vessel was offered to the United States Government but was not accepted. The French were the first to adopt armor-plating. In 1854 they sent floating batteries to the Black Sea, sheathed with 4¾ inches of laminated iron, which was proof against the fire of the 68-pounders, then the most powerful guns. The British admiralty, following this example, sent out very slow and unmanageable iron-clad batteries in 1855-1856. These batteries protected the ships very well against round balls from the unrifled cannon of the day. It was not, however, till the American Civil War that armor-plating came into general use. The Confederate ram "Merrimac" was the first practical armor-plated vessel in the United States, her sheathing consisting of railroad rails. Her successful opponent, the "Monitor," was heavily sheathed with laminated iron plates extending several feet below the water line.

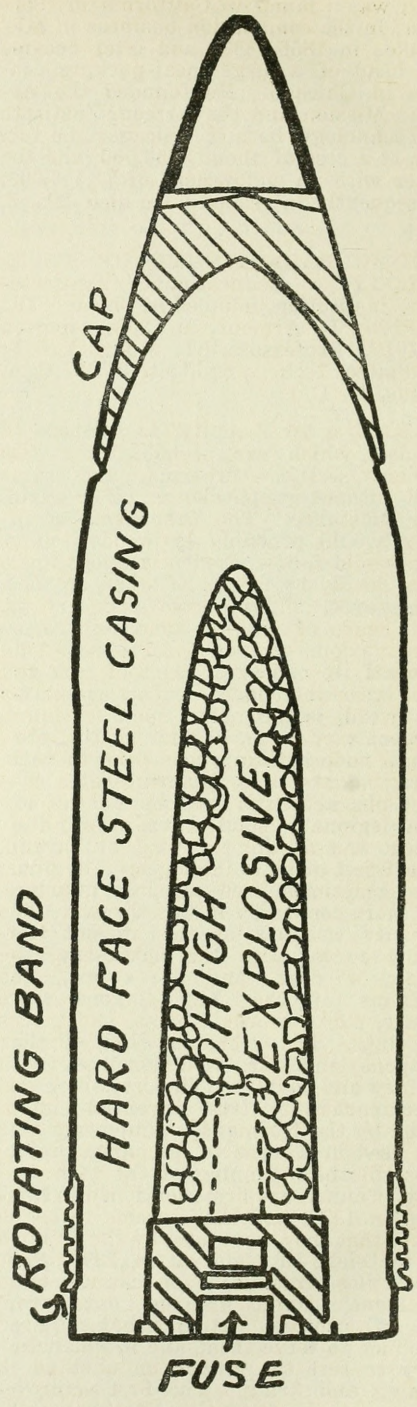
Harvey introduced the process of carbonizing the face of armor-plate, greatly increasing its hardness. The plate, having been placed in a furnace, is covered with a layer of carbonizing material about a foot thick, over which is laid a covering of brick to exclude the flame and air from the carbonizing material. The doors of the furnace are bricked up and a high heat maintained for about 100 hours. The plate is removed and its surface cleared when cold, it is then reheated, and sprayed with cold water, producing an exceedingly hard surface. This Harveyized steel was used for nearly all the American and foreign men-of-war, until, in 1895, a process was discovered at the iron works of Krupp, at Essen, by which the face of the plate was made so hard that it cut glass like a diamond, while the back remained so tough that it would suffer no injury from cracks when struck by a projectile. The Krupp process is somewhat similar to, and an improvement on, the Harvey process.

A Harveyized plate has been pierced to a depth of 14 inches by a 6-inch soft-capped projectile, so that the cap showed on the back. The Krupp armor is perforated, but not cracked, by a projectile with a velocity exceeding 2,500 feet per second. The Harvey plate is cracked but rarely perforated at a velocity of less than 2,000 feet per second. The projectiles used for testing purposes vary from 100 pounds to 850 pounds in weight.

ARMORY, a building used for the housing, assembling, and drilling of troops, for the storage of arms and equipment, or for purposes of defense. In the United States the term is generally employed in speaking of local headquarters of the National Guard.

ARMOUR, JONATHAN OGDEN, an American capitalist, born in Milwaukee in 1863. He studied at Yale, but without having completed his course, he entered the meat-packing business of his father, Philip D. Armour, and on the death of the latter became head of the firm of Armour & Co. In this capacity he came in constant conflict with committees appointed to investigate the meat-packing business, from 1914 to 1920. He strongly defended the course of the meat packers throughout the war in newspapers and periodicals. He wrote "The Packers and the People" (1906).

ARMOUR, PHILIP DANFORTH, an American merchant and philanthropist, born in Stockbridge, N. Y., May 16, 1832; received a common school educa-



ARMOR-PIERCING SHELL

tion; was a miner in California in 1852-1856; in the commission business in Milwaukee in 1856-1863; and later became the head of a large meat-packing concern in Chicago. He founded the Armour Mission and the Armour Institute of Technology, both in Chicago; the former at a cost of about $250,000, and the latter with an endowment of $1,500,000, subsequently increased. He died Jan. 6, 1901.

ARMOUR INSTITUTE OF TECHNOLOGY, a coeducational (non-sectarian) institution, founded in Chicago, Ill., by Philip D. Armour, in 1893; reported in 1919: Professors, 67; students, 615; graduates, 1,216; president, F. W. Gunsaulus, D. D.

ARMS, a term applied to weapons of offense, which are divisible into two distinct sections—firearms, and arms used without gunpowder or other explosive substance. The first arms of offense would probably be wooden clubs, then would follow wooden weapons made more deadly by means of stone or bone, stone axes, slings, bows and arrows, with heads of flint or bone, and afterward various weapons of bronze. Subsequently a variety of arms of iron and steel were introduced, which comprised the sword, javelin, pike, spear or lance, dagger, axe, mace, chariot scythe, etc.; with a rude artillery consisting of catapults, ballistæ, and battering-rams. The most characteristic weapon of the Roman legionary soldier was the pilum, which was a kind of pike or javelin, some 6 feet or more in length. The pilum was sometimes used at close quarters, but more commonly it was thrown. The favorite weapons of the ancient Germanic races were the battle-axe, the lance, or dart, and the sword. The weapons of the Anglo-Saxons were spears, axes, swords, knives, and maces or clubs. The Normans had similar weapons, and were well furnished with archers and cavalry. The cross-bow was a comparatively late invention introduced by the Normans. Gunpowder was not used in Europe to discharge projectiles till the beginning of the 14th century. Cannon are first mentioned in England in 1338, and there seems to be no doubt that they were used by the English at the siege of Cambrai in 1339. The projectiles first used for cannon were of stone. Hand firearms date from the 15th century. At first they required two men to serve them, and it was necessary to rest the muzzle on a stand in aiming and firing. The first improvement was the invention of the matchlock, about 1476; this was followed by the wheel-lock, and about the middle of the 17th century by the flint-lock, which was in universal use until it was superseded by the percussion-lock, the invention of a Scotch clergyman early in the 19th century. The needle-gun dates from 1827. The only important weapon not a firearm that has been invented since the introduction of gunpowder, is the bayonet, which is believed to have been invented about 1650. The principal weapons used in modern warfare will be found under their respective names.

ARMS, COAT OF, or **ARMORIAL BEARINGS**, a collective name for the devices borne on shields, banners, etc., as marks the dignity and distinction, and, in the case of family and feudal arms, descending from father to son. They were first employed by the crusaders, and became hereditary in families at the close of the 12th century. They took their rise from the knights painting their banners or shields each with a figure or figures proper to himself, to enable him to be distinguished in battle when clad in armor.

ARMSTRONG, JOHN, an American author and soldier, born at Carlisle, Pa., Nov. 25, 1758; served in the War of the Revolution on the staff of General Gates; was United States Minister to France, 1804-1810, afterward to Spain; and Secretary of War, 1813-1814. Author of "Newburg Letters," begun in camp, 1783, anonymously, and intended to arouse Congress to redress army grievances. He also wrote "Notices of the War of 1812" (1836). He died at Red Hook, N. Y., April 1, 1843.

ARMSTRONG, SAMUEL CHAPMAN, an American educator, born in Hawaii in 1839, a son of Richard Armstrong, an American missionary to the Sandwich Islands. In 1860 he came to the United States; in 1862 was graduated at Williams College; and in June of the same year he organized a company for the 125th Regiment of New York Infantry, and with it was assigned to the Army of the Potomac. At Harper's Ferry he was captured and held prisoner for three months. After the close of the war he was mustered out of the volunteer service with the rank of brigadier-general. During his service he volunteered for the command of a regiment of colored troops, with whom he served two years. In 1866 he took up the work of the Freedman's Bureau and at first had the oversight of the colored people in 10 counties of Virginia. After two years in this work he founded a school which afterward became famous as the Hamp-

ton Normal and Agricultural Institute. The United States Government began sending Indian youths there in 1878. General Armstrong was president of the Institute till his death, May 11, 1893.

ARMSTRONG, WILLIAM GEORGE, LORD, an English inventor, born in 1810 at Newcastle. He was articled to a solicitor, and became a partner in the firm. In 1840 he produced a much improved hydraulic engine, and in 1845 the hydraulic crane. In 1842 he brought to perfection an apparatus for producing electricity from steam. He was elected a member of the Royal Society in 1846; and shortly afterward commenced the Elswick Engine Works, Newcastle, producing hydraulic cranes, engines, accumulators, and bridges, but was soon to be famous for the production of ordnance. During the Crimean War, Armstrong was employed by the War Office to make explosive apparatus for blowing up the ships sunk at Sebastopol. This led him to devise the form of cannon which bears his name. The essential feature of the Armstrong gun, whether rifled or smooth bore, breech-loading or muzzle-loading, is that the barrel is built up of successive coils of wrought-iron, welded round a mandrel into a homogeneous mass of great tenacity, the breech being especially strengthened on similar principles. The actual results obtained by these guns, even of the earlier patterns, were almost incredible. An ordinary 32-pounder weighed 5,700 pounds. Armstrong's 32-pounder weighed 2,600 pounds. The former required 10 pounds of powder as a charge; for the latter 5 pounds sufficed. The former would send a shot or shell 3,000 yards; the range of the latter exceeded 9,000 yards. Armstrong offered to the government all his inventions; and, till 1863, there existed a kind of partnership between the government and the Elswick firm, Armstrong being knighted in 1858, and appointed chief-engineer of rifled ordnance. Already a member of many scientific societies, he was in 1863 President of the British Association. Cambridge and Oxford conferred honorary degrees on Armstrong, who was raised to the peerage as Baron Armstrong in 1887. He died Dec. 27, 1900.

ARMY, the national militia of a country. The organization of an army is of two kinds—tactical and administrative. The former enables the leader of an army to transmit his orders to three or four subordinate commanders, who pass them on, the latter deals with the paying, feeding, clothing, arming and transportation of the military forces.

Ancient Armies.—The earliest regular military organization is attributed to Sesostris, who flourished in Egypt about 16 centuries B. C. This extraordinary conqueror divided Egypt into 36 military provinces, and established a sort of militia or warrior caste. With this army he overran Asia as far as India, and from the Ganges to the Caspian. After him little further progress was made in military art until the Persian empire rose. Its soldiers introduced the mass formation, with cavalry in intervals of squares; but the most important feature of the Persian organization was the establishment of what was practically a standing army, apportioned as garrisons throughout the conquered provinces, and under the control of military governors distinct from the satraps. In Greece it was not a standing army, but a sort of national militia, that gained Marathon, Platæa, and Mycale. The Lacedemonians invented the famous phalanx, a particular mass formation for foot-soldiers; and to this the Athenians added lighter troops to cover the front and harass the enemy in march. The Thebans introduced the column formation, which, being deeper and narrower than the phalanx, was intended to pierce the enemy's line at some point and throw them into confusion. Philip, the father of Alexander the Great, established, in Macedonia, the world's second standing army. He brought into use the Macedonian pike, a formidable weapon 24 feet in length. About 200 B. C. every Roman from the age of 17 to 46 was liable to be called upon to serve as a soldier. The Roman legion, in its best days, excelled all other troops alike in discipline and in *esprit*. With a gradual laxity in discipline the decline of the Roman power commenced.

Medieval Armies.—With the decline of the Roman power all that remained of scientific warfare was lost for a time. The Northern invaders made little use of tactics, but relied chiefly on their personal bravery. The conquerors of the Roman Empire at first recognized no superior save the community, of which all conquests were the property. What all had aided to acquire all demanded equally to share. Hence arose a division of the conquered territory, individual chiefs rewarding their own followers with gifts of the land they had helped to conquer. The growth of a feeling that such gifts could be revoked, and that they implied an obligation to future service, marks the beginning of the feudal system, under which national armies disappeared, and each baron had a small

army composed of his own retainers, available for battle at short notice. The contest of these small armies, sometimes combined and sometimes isolated, make up the greater part of the military annals of the Middle Ages. From this period dates the modern recognition of the importance of an army which under the franchise extended to the towns, and the superiority of which, since the overthrow of the Burgundian chivalry by Swiss infantry, in the three disastrous battles of 1476-1477, has never been disputed. The invention of gunpowder affected much less change during the Middle Ages than is generally supposed. The art of making good cannon and handguns grew up gradually, like other arts; and armies long continued to depend principally on the older weapons, spears, darts, arrows, axes, maces, swords and daggers. As to army formation, there was still little that could deserve the name; there was no particular order of battle.

Modern Armies.—The Turkish Janizaries, the earliest standing army in Europe, were fully organized in 1632; but the formation of standing armies among Western Powers dates from the establishment of *compagnies d'ordonnance* by Charles VII., of France, nearly a century later. These companies of men-at-arms amounted, with their attendants, to 9,000 men; to whom the King afterward added 16,000 franc-archers. The superiority of such a force over militia forced its adoption on the surrounding states. Between the beginning of the 16th and the end of the 18th centuries the proportion of musketeers gradually increased; the pike was abandoned for the bayonet. The improvement in weapons naturally effected the formation. During the Thirty Years' War (1618-1648) Gustavus Adolphus and Wallenstein adopted opposite modes of dealing with masses of infantry; the former spread them out to a great width, and only six ranks in depth, whereas the latter adopted a narrower front with a depth of 20 or 30 ranks. In Louis XIV.'s reign the prolonged wars introduced the larger grouping in brigades and divisions. Frederick the Great, in the next century, reduced the depth of his infantry formation to three ranks, and introduced a most rigid and exact system of tactics and drill, so that when able to maneuver he nearly always won his battles. The French Revolution effected almost as great changes in the military as in the political organization of Europe. In 1798, a law was passed establishing compulsory military service. Every citizen was liable to five years' service, and all between the ages of 20 and 25 were enrolled. The immense advantage which this terrible power gave Napoleon compelled other nations to follow the example of France, and in Europe voluntary enlistment has since survived in England alone. Great Britain organized and developed mounted infantry which were used effectively in the Boer War and in the World War (1914-1918). They were employed by the United States in Indian and Philippine campaigns, but it was only as a temporary expedient. It may be interesting here to mention certain distinctions in the application of the word army. A covering army is encamped for the protection of the different passes or roads which lead to the town or other place to be protected. A siege army is ranged around or in front of a fortified place, to capture it by a regular process of besieging. A blockading army, either independent of, or auxiliary to, a siege army, is intended to prevent all ingress and egress at the streets or gates of a besieged place. An army of observation takes up an advanced position, and by celerity of movement keeps a close watch on all the maneuvers of the enemy. An army of reconnaissance has a more special duty at a particular time and place, to ascertain the strength and position of the enemy's forces. A flying column is a small army carrying all its supplies with it, so as to be able to operate quickly and in any direction, independently of its original base of operations.

ARMY CORPS, one of the largest divisions of an army in the field, comprising all arms, and commanded by a general officer; subdivided into divisions, which may or may not comprise all arms.

ARMY SCHOOLS. See MILITARY EDUCATION.

ARMY WAR COLLEGE, a department of the United States military educational establishment authorized by Congress in 1900. Brig.-Gen. William Ludlow was made chief of the board which drafted the regulations. The faculty of the college study the military organization of the United States with an eye to a complete understanding of its practical efficiency of operations, and constitute an advisory board to which the Secretary of War can turn at any time for details and recommendations as to any point in the mechanism of the whole military service. The study of plans of campaign by the college and the accumulation of military information make the inauguration of a campaign, in case of war, only a matter of the issuing of the necessary orders by the Secretary.

ARMY WORM, the very destructive larva of the moth *heliophila* or *leucania unipuncta*, so called from its habit of marching in compact bodies of enormous number, devouring almost every green thing it meets. It is about 1½ inches long, greenish in color, with black stripes, and is found in various parts of the world, but is particularly destructive in North America. The larva of *sciara militaris*, a European two-winged fly, is also called army worm.

ARNAULD, the name of a French family, several members of which greatly distinguished themselves. ANTOINE, an eminent French advocate, was born 1560, died 1619. Distinguished as a zealous defender of the cause of Henry IV., and for his powerful and successful defense of the University of Paris against the Jesuits in 1594. His family formed a nucleus of the sect of the Jansenists in France. His son ANTOINE, called the Great Arnauld, was born Feb. 6, 1612, at Paris; died Aug. 9, 1694, at Brussels. He devoted himself to theology, and was received, in 1641, among the doctors of the Sorbonne. He engaged in all the quarrels of the French Jansenists with the Jesuits, the clergy, and the government, was the chief Jansenist writer, and was considered their head. Excluded from the Sorbonne, he retired to Port Royal, where he wrote, in conjunction with his friend Nicole, a celebrated system of logic (hence called the "Port Royal Logic"). On account of persecution he fled, in 1679, to the Netherlands. His works, which are mainly controversies with the Jesuits or the Calvinists, are very voluminous. His brother ROBERT, born in 1588, died in 1674, was a person of influence at the French court, but latterly retired to Port Royal, where he wrote a translation of "Josephus" and other works. Robert's daughter ANGÉLIQUE, born in 1624, died in 1684, was eminent in the religious world, and was subjected to prosecution on account of her unflinching adherence to Jansenism.

ARNDT, ERNST MORITZ, a German writer and patriot, born at Schoritz, Isle of Rügen, Dec. 29, 1769. On the publication, in 1806, of the first series of his "Spirit of the Times," which kindled patriotic enthusiasm throughout the German lands, he was compelled to take refuge in Sweden. In 1848, a member of the National Assembly, he belonged to the so-called imperial party, advocating the union of Germany under the leadership of Prussia. On his 90th birthday (1859) the whole nation united in paying him homage. Many of his poems have become national lyrics. Among them are "What is the German's Fatherland?" and "The Song of the Field Marshal." He died in Bonn, Jan. 29, 1860.

ARNEE, one of the numerous Indian varieties of the buffalo (*bubalis arni*), remarkable as being the largest animal of the ox kind known. It measured about 7 feet high at the shoulders, and from 9 to 10½ feet long from the muzzle to the root of the tail. It is found chiefly in the forests at the base of the Himalayas.

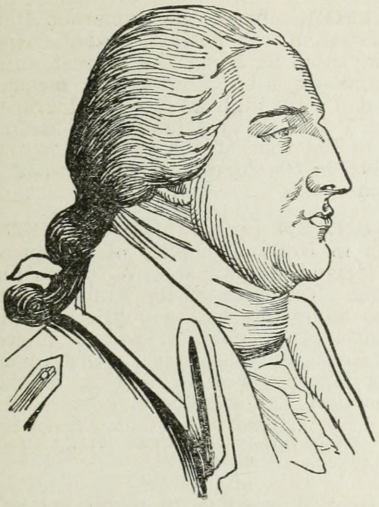
ARNHEM (ar'nem), or **ARNHEIM**, a town in Holland, capital of province of Gelderland, 18 miles S. W. of Zutphen, on the right bank of the Rhine. It contains many interesting public buildings; manufactures cabinet wares, mirrors, carriages, mathematical instruments, etc.; has paper-mills, and its trade is important. In 1795 it was stormed by the French, who were driven from it by the Prussians in 1813. Pop. (1917) 70,664.

ARNICA, a genus of plants belonging to the order *asteraceæ*, or composites; also the English name of plants belonging to the above-mentioned genus, and especially of the *A. montana*, the mountain arnica, or German leopard's-bane. It is common in the alpine parts of Germany, Sweden, Lapland, and Switzerland. It is a perennial, of a slightly fetid odor, and a bitterish, acrid taste. Given in large quantities it produces deleterious effects, but the powdered leaves, in moderate doses, of 5 to 10 grains, have been found serviceable in paralysis, convulsions, amaurosis, chlorosis, gout, and rheumatism. As an outward application, arnica is in constant use as a remedy for sores, wounds, bruises, and ailments of a similar kind.

ARNO, a river of Italy, which rises in the Etruscan Apennines, makes a sweep to the south and then trends westward, divides Florence into two parts, washes Pisa, and falls, 4 miles below it, into the Tuscan Sea, after a course of about 130 miles.

ARNOLD, BENEDICT, an American military officer, born in Norwich, Conn., Jan. 14, 1741. He was settled in extensive business at New Haven when the War of Independence broke out. After the news of the battle of Lexington, he raised a body of volunteers, and received a colonel's commission. After commanding, for a short time, a small fleet upon Lake Champlain, he was with General Montgomery, charged with the difficult duty of leading a force of 1,100 men

across the wilds of the country to Quebec, to stir up rebellion there, and displace the British garrison. In this unsuccessful attempt Montgomery was killed



BENEDICT ARNOLD

and Arnold severely wounded. After this, we find him in various important commands, but as often involved in quarrels with Congress and his fellow-officers. Washington valued him for his acts of daring, and would gladly have overlooked his faults; but Congress and his brother-officers regarded him with dislike, and sought every possible means to humble and annoy him. After many disputes about the honor that was due to him for his services, he was invested with the government of Philadelphia. There his imprudence was most marked and he was court-martialed and reprimanded. Arnold felt humiliated, and decided to desert to the enemy, opening communication with Sir Henry Clinton, British commander. Major André was sent by Sir Henry to negotiate with Arnold, and they had an interview near West Point, which fortress Arnold had offered to surrender to the enemy. On his way to the British camp, however, the young officer fell into the hands of the Americans, and the whole plot was of course discovered. The news of André's capture reached Arnold just in time to enable him to make his escape and reach the British camp in safety. There he retained his rank of brigadier-general, and fought with as much daring against the cause of American independence. Afterward he served in Nova Scotia and the West Indies, and at last settled in London, England, where he died June 14, 1801.

ARNOLD, SIR EDWIN, an English poet and journalist, born at Gravesend, June 10, 1832. He was graduated at Oxford in 1853; taught for a while in Birmingham; and became principal of the Sanskrit College at Poona, in the Bombay Presidency. Returning to London in 1861, he joined the editorial staff of the "Daily Telegraph." He twice visited the United States on lecture tours. Of his original poetry, inspired by Oriental themes and legends, the most famous work is "The Light of Asia, a Poetic Presentation of the Life and Teaching of Gautama" (1876). "Indian Idylls" (1883); "Pearls of the Faith," "Sa'di in the Garden," "The Light of the World," "Potiphar's Wife and Other Poems," "India Revisited," "Japonica," and "The Tenth Muse and Other Poems," are among his many works. He died March 24, 1904.

ARNOLD, MATTHEW, an English poet, critic, and essayist, born at Laleham, Dec. 24, 1822; graduated at Oxford in 1844, and was Professor of Poetry there from 1857 to 1867. The degree of Doctor of Laws was conferred by the University of Edinburgh in 1869, and by Oxford in 1870. He was government inspector of schools from 1851, and repeatedly visited the Continent to inquire into and report upon systems of education. In 1883-1884 he made a lecturing tour through the United States. His works include "The Strayed Reveler and Other Poems" (1848); "Empedocles on Etna" (1853); "Merope," a tragedy (1857), and "New Poems" (1868). His prose writings comprise "Essays in Criticism" (1865, 2d series, 1888); "Lectures on the Study of Celtic Literature" (1867); "Culture and Anarchy" (1869); "Friendship's Garland" (1871), a humorous work; "Literature and Dogma" (1873); "Last Essays on Church and Religion" (1877); "Mixed Essays" (1879); "Irish Essays" (1882), and "Discourses on America" (1885). Arnold first became known as a poet of classical taste by the volume of poems and selections issued under his name in 1854. He died in Liverpool, April 15, 1888.

ARNOLD OF BRESCIA, one of the reformers prior to the Reformation, a disciple of Abelard of Paris, and of Berengarius. As early as the middle of the 12th century, his bold spirit, his scriptural knowledge, and his eloquence, had succeeded in arousing France and Italy against the abuses of the Roman Church. Driven by the clergy from Italy, he sought refuge in Zurich, where he made many converts. At length, through the instigation of St. Bernard of

Clairvaux, he was charged with heresy, and excommunicated by Pope Innocent II. At this juncture, serious popular tumults occurred at Rome, and Arnold, hastening thither, was received with great cordiality, and soon vested with supreme power. In 1155, however, Adrian IV. interdicted and expelled him from the city. For a time he lived in Campagna, but was seized, and taken back to Rome, where he was executed, and his ashes were thrown into the Tiber. His followers were called Arnoldists, and held the same opinions as the Waldenses.

ARNOLD OF WINKELRIED, a Swiss hero, who, at the battle of Sempach, in 1386, sacrificed himself to insure victory to his countrymen. The Austrian knights, dismounted, had formed themselves into a phalanx, which the Swiss vainly strove to pierce; when Arnold, rushing on the spear points of the enemy, and burying several in his breast, thus opened a gap in the fence of steel. The Swiss rushed in through the opening, and routed the Austrians with great slaughter.

ARNOLD, RALPH, a geologist and engineer, born in Marshalltown, Ia., in 1875. He was educated at the Throop Polytechnic Institute and the Leland Stanford, Jr., University. Graduating from the latter in 1889, he was assistant in geology at that institution until 1903. After serving in various capacities he became, in 1908, geologist of the United States Geological Survey. From 1911 he was consulting petroleum engineer of the United States Bureau of Mines and engaged also in private practice. He took charge of many investigations in petroleum fields in the United States and foreign countries, was special lecturer on petroleum at the University of Chicago and other universities and colleges, a member of many scientific societies, and contributed many papers on geological subjects to the United States Geological reports and professional periodicals.

ARNOLD, THOMAS, an English clergyman and historian, born in Cowes, Isle of Wight, June 13, 1795. He entered Oxford University in 1811, and was elected a fellow of Oriel College in 1815. In 1828, Arnold was elected to the head-mastership of Rugby School, which office he held until his death, and raised it, by the enlightened system of education he inaugurated, to the highest rank among the great public schools of England. In politics he was an advanced Liberal, so much so, indeed, that he was at one time denounced by some of the clergy for what they termed the Jacobinism of his views. In 1841 he was appointed Regius Professor of Modern History at Oxford, and died June 12, 1842. As a writer, Arnold's works consisted mainly of a "History of Rome," completed to the end of the Punic War; a "Commentary on the New Testament," and a "Treatise on Church and State." His life has been written by Dean Stanley, one of his old pupils.

ARNOLFO DI CAMBIO (ar-nōl'fō), or **DI LAPO**, an Italian architect and sculptor, born in Florence, in 1232. The most celebrated of his architectural works are the churches of Santa Croce, the Cathedral, and Or San Michele, at Florence, in which the gradual transition from the Gothic severity to the Italian elegance is markedly represented. This structure was completed, after the death of Arnolfo, by Brunelleschi, between 1420 and 1444. He died in 1300.

ARNON, a river in Palestine, the boundary between the country of the Moabites and that of the Amorites, latterly of the Israelites, a tributary of the Dead Sea.

ARNOTTO. (1) The waxy-looking pulp which envelops the seeds in the arnotto tree. This is detached by throwing the seed into water, after which it is dried partially, and made up first into soft pellets, rolled in leaves, in which state it is called flag, or roll arnotto. Afterward, becoming quite dry, it is formed into cakes, and becomes cake arnotto. The South American Indians color their bodies red with it; farmers here and elsewhere use it to stain cheese; in Holland, the Dutch employ it to color butter; the Spaniards put it in their chocolate and soups; dyers use it to produce a reddish color, and varnish makers, to impart an orange tint to some varnishes. As a medicine, it is slightly purgative and stomachic. This substance is very frequently adulterated.

(2) In botany, the arnotto tree, the *bixa orellana* of Linnæus, has a five-dentate calyx, 10 petals, many hypogynous stamina, and a two-valved hispid capsule. It is from 20 to 30 feet in height, and grows in tropical America. It is the type of the old order *bixaceæ*, now more generally called *flacourtiaceæ*.

ARNULF, a great-grandson of Charlemagne, elected King of Germany in A. D. 887; invaded Italy, captured Rome, and was crowned Emperor by the Pope (896); died A. D. 899.

AROMATIC. (1) In chemistry, acids whose radical has the form $C_nH_{2n}—_8O_2$, as the benzoic, the toluic, and the cum-

mic, or cumic. There are also aromatic alcohols, aldehydes, hydrocarbons, and ketones. (2) A plant or a substance which exhales a fragrant odor, conjoined in general with a warm, pungent taste.

AROMATIC VINEGAR, a very volatile and powerful perfume, made by adding the essential oils of lavender, cloves, etc., and often camphor, to crystallizable acetic acid. It is a powerful excitant in fainting, languor, and headache.

AROOSTOOK, an American river; rises in Piscataquis co., Me.; flows more than 120 miles in a circuitous course, receiving many important tributaries; and enters the St. John River in New Brunswick. It was an important factor in the settlement of the long-pending dispute concerning the boundary between the United States and British America.

AROUET. See VOLTAIRE.

ARPAD, the conqueror of Hungary, and founder of the Arpad dynasty, which reigned till 1301, was born in the second half of the 9th century. He was the son of Almus, whom the seven Magyar clans dwelling in the steppes N. E. of the Caspian Sea had elected their hereditary chief about 889. Thus united into one nation, the Magyars, mustering about 25,000 warriors, crossed the Carpathians and conquered Hungary, when Arpad was elected their prince. Arpad was unable completely to transform their nomadic hordes into an agricultural nation. He died in 907.

ARPEGGIO (ar-pej'ō), the distinct sound of the notes of an instrumental chord; the striking the notes of a chord in rapid succession, as in the manner of touching the harp instead of playing them simultaneously.

ARPENT (ar-pan), formerly a French measure for land, equal to five-sixths of an English acre; but varying in different parts of France.

ARPINO (ar-pē'no), a town of south Italy, province of Caserta, 94 miles N. W. of Naples. It is the ancient Arpinum, birthplace of Caius Marius, Agrippa, and Cicero; pop. about 10,000.

ARQUA (ar'kwa), a town of north Italy, 12 miles S. W. of Padua, in which province it is situated. It is famous for having been the residence of Petrarch during the greater part of his life, and the place where he died in 1374. His sarcophagus is still to be seen.

ARQUEBUS, a hand-gun; a species of firearm resembling a musket, anciently used. It was fired from a forked rest, and sometimes cocked by a wheel, and carried a ball that weighed nearly two ounces. A larger kind used in fortresses carried a heavier shot.

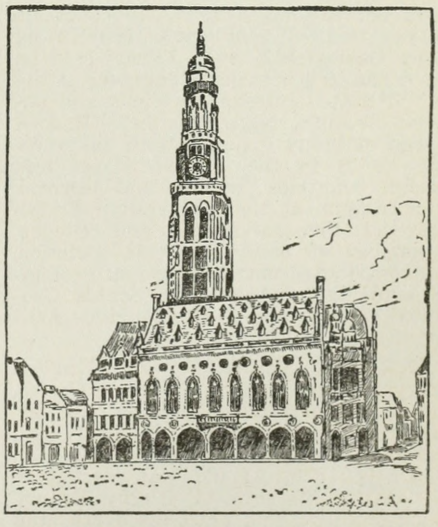
ARRACACHA, a genus of plants belonging to the order *apiaceæ*, or umbellifers. *A. esculenta* is cultivated for the sake of its root which is used as an esculent in the elevated portions of equinoctial America.

ARRACK, a term used, in the countries to which the Arabs have penetrated, for distilled spirits, especially those distilled from rice and the sap of palm trees.

ARRAH, a town of British India, in Shahabad district, Bengal, rendered famous during the mutiny of 1857 by the heroic resistance of a body of 20 civilians and 50 Sikhs, cooped up within a detached house, to a force of 3,000 Sepoys, who were ultimately routed and overthrown by the arrival of a small European reinforcement. Pop. about 50,000.

ARRAIGNMENT, in the practice of criminal law the calling of a prisoner by his name to the bar of the court to answer the matter charged upon him in the indictment.

ARRAS (ar-ä'), a city of France, capital of the department of Pas-de-Calais, 60 miles S. E. of Calais, and 100



TOWN HALL AT ARRAS, FRANCE, BEFORE THE WORLD WAR

miles N. N. E. of Paris. It is a very ancient city, and previous to the World War was replete with fine old architectural remains, and also possessing a

large commerce in cotton and stuffs, hosiery, lace, pottery, etc. Arras has been the theater of many memorable historical events, and was fortified by Vauban, in the reign of Louis XIV. Robespierre was born here, as was also Damiens, the assassin of Louis XV. During the Middle Ages, Arras was famed for its tapestry, richly figured hangings that adorned the halls of the kings and the nobles. They were known under the name of arras; but have been for a long time superseded by the tapestry of the Gobelins. Arras was the capital of the Celtic Atrebates (whence the name), and consequently of the province of Artois. As such it was long a part of Burgundy. It was ceded to France in 1482; attached to Austria in 1493; and finally became French in 1640, when Louis XIII. took it after a long siege.

In the World War the town was wrecked by bomdardments. The Germans attacked the place three times in October, 1914. From Oct. 20 to 26 Arras was under heavy fire. Eventually the French under General Maud'huy drove the Germans back so far that their howitzers could no longer threaten the town. Pop. about 26,000.

ARRAS, BATTLES OF, a series of important engagements in the World War which took place in the neighborhood of the city of Arras, France. This area, from the autumn of 1914, following the German attempt to break through the Allied lines to the channel ports, was the scene of almost continual operations. The city itself was exposed to repeated bombardments and was almost completely destroyed. The most important offensive in the vicinity was undertaken by the British in the spring of 1917. It was carried on a 12-mile front N. and S. of Arras, and was gradually extended to an offensive over the whole line from Arras to St. Quentin. The defense was prepared by an artillery bombardment which lasted four days. On the fifth day of the battle the Canadian troops stormed Vimy Ridge, capturing 4,000 prisoners and large quantities of war material. The advance continued on April 11 when Monchy and other towns were captured. On April 13 the British swept forward from a new position E. of Arras and drove the Germans back on a 12-mile front, capturing six villages and seriously threatening the city of Lens. The outskirts of that city were entered on April 15. After a pause of several days, the British on April 24 pushed forward E. of Monchy. Three days later they broke the Oppy line, a switch of the Hindenburg line. On May 3 they captured Fresnoy and a part of Bullecourt, but were later obliged to give these up. The battle reached a standstill on May 15, 1917. The British were driven back, in the first two weeks of June, E. of Loos. The chief effects of the battle, aside from the capture of over 15,000 Germans and 200 guns, was the placing of Lens in a pocket which constantly tightened until its final capture by the British. See WORLD WAR.

ARRHENATHERUM, a genus of plants belonging to the order *graminaceæ*, or grasses. A species grows wild in England, *A. avenaceum*, or tall, oat-like grass. It is also cultivated occasionally in England, and much more frequently in France, but is not very nutritious.

ARRHENIUS, SVANTE, a Swedish chemist, born in 1849 near Upsala. He was educated in the university of that city and, after teaching for a short time, spent several years abroad carrying on original investigations in physical chemistry. In 1891 he became professor at the University of Stockholm. His contributions to the study of electrolytic phenomena and the chemical and physical properties of substances are of the utmost importance. He established the so-called theory of electrolytic dissociation. Arrhenius wrote much on chemical subjects and in 1907 published a series of lectures delivered at the University of California. In 1903 he received the Nobel Prize for chemistry. Perhaps his most popular work is "Worlds in the Making" (1908), in which he combatted the theory that the universe is tending to destruction by loss of heat and motion.

ARRIA (ar'ē-a), a celebrated Roman matron, wife of Cæcinna Pætus, consul during the reign of Claudius, about A. D. 41. Pætus having raised an unsuccessful revolt against Claudius, in Illyria, was condemned to die. He was, however, allowed the option of ending his life by suicide, which the Romans did not deem a crime. Pætus hesitated; Arria seized the dagger, plunged it into her bosom, and then presenting it to her husband, said, "It is not painful, Pætus." This, with other instances of her conjugal devotion, has immortalized her.

ARRIAGA, MANOEL DE, a Portuguese statesman, born in 1842 at Horta in the Azores. He was educated at the University of Coimbra, and after studying law he practiced in Lisbon. For many years he was a member of the Chamber of Representatives as a Re-

publican. He violently opposed the monarchy and in 1911 took an active part in the establishment of the republic. On Aug. 24 of that year he was elected the first president of Portugal, serving until May 27, 1915, when he resigned as the result of the *coup d'état* of that year. He was well known as a poet and a writer on economic subjects. He died March 5, 1917.

ARROW, a missile weapon, designed to be propelled by the impulse communicated by the snapping of the string of a bow, temporarily bent into an angular form, back to its normal state of rest in a straight line. To make the wound it inflicts more deadly, and prevent its being easily pulled out, it is barbed at the tip, and often poisoned, while at the other extremity it is feathered, to make it move more directly forward.

ARROWHEAD, a genus of aquatic plants found in all parts of the world within the torrid and temperate zones, natural order *alismaceæ*, distinguished by possessing barren and fertile flowers, with a three-leaved calyx and three colored petals. The common arrowhead (*S. sagittifolia*) has a tuberous root, nearly globular, and is known by its arrow-shaped leaves with lanceolate straight lobes.

ARROW LAKE, an expansion of the Columbia river, in British Columbia, Canada; about 95 miles long from N. to S.; often regarded as forming two lakes —Upper and Lower Arrow Lake.

ARROWROOT. (1) In botany, the English name of the botanical genus maranta, the type of the endogenous order *Marantaceæ*. The flowers of maranta are in long, close, spike-like panicles, with irregular corollas. The root is a fleshy corm, which, when washed, grated, strained through a sieve, and again repeatedly washed, furnishes the substance so much prized as good for invalids, which is described under 2.

(2) In commerce, the starch extracted from the rhizomes of a maranta, and exported to England in large quantities from the East and West Indies, and from Africa, each importation taking the name of the place from which it comes. Thus they have East Indian arrowroot, Bermuda arrowroot, St. Vincent arrowroot, Natal arrowroot, etc.

Arrowroot is adulterated either by the mixing together of various qualities of arrowroot, or by the admixture of other starches, such as potato or tapioca.

ARROYO MOLINOS (ar-oi'o-mō-lē'-nōs), a town of Spain, in Estremadura, 27 miles S. S. E. of Caceres. Here, on Oct. 28, 1811, a body of the French sent out by Soult on a foraging expedition was surprised by a much larger English force under Lord Hill. An engagement took place, the result of which is differently appreciated by the historians of the two nations. The English took 1,300 prisoners, but the French retreated in good order.

ARRU ISLANDS (ar'ö), a group of over 80 islands in the Dutch East Indies, lying W. of New Guinea, with a united area of about 2,650 square miles and a population of about 23,000. The largest island is Tanna-Besar (77 miles long by 50 broad). The surface is low, and the coasts are steep and inaccessible, on the E. side fringed with coral reefs. The soil is covered with the most luxuriant vegetation. The islands are remarkably rich in animal life. The inhabitants resemble the Melanesians of New Guinea more than the natives of the Moluccas. There is an active trade, but not in native hands. Cotton and woolen goods, iron and copper wares, Chinese pottery, knives, rum, rice, opium, and arrack are imported, and bartered for mother-of-pearl, trepang, edible nests, pearls, tortoise-shell, and the skins of birds of paradise.

ARSACES, founder of the Parthian monarchy. He induced his countrymen to rise against the Macedonian yoke, 250 B. C., on which they raised him to the throne. Arsaces was slain in battle, after a reign of 38 years. He was the first of a long line of monarchs of the same name, the last of whom was put to death about 226 A. D.

ARSACES TIRANUS, King of Armenia, who, being taken prisoner by Sapor, King of Persia, was cast into prison at Ecbatana, where he died 362 B. C. His country then became a Persian province.

ARSENAL, a place appointed for the making, repairing, keeping and issuing of military stores. An arsenal of the first class should include factories for guns and gun-carriages, small-arms, small-arms ammunition, harness, saddlery, tents and powder; a laboratory and large storehouses. In arsenals of the second class, workshops take the place of the factories. The Royal Arsenal at Woolwich, England, which manufactures warlike implements and stores for the English army and navy, was formed about 1720, and comprises factories, laboratories, etc., for the manufacture and final fitting up of almost every kind of arms and ammunition. Great quantities of military and naval stores are kept at the dockyards of Chatham, Portsmouth,

Plymouth, and Pembroke. In France there are various arsenals or depots of war material at L'Orient, Rochefort, Cherbourg, Mézières, Toulouse, etc.; the great naval arsenals are Brest and Toulon. The chief German arsenals were at Spandau, Strasburg, and Dantzig, that at the first-mentioned place having been the great center of the military manufactories. The chief Austrian arsenal was the immense establishment at Vienna, which includes gun factory, laboratory, small-arms and carriage factories, etc. Russia had her principal arsenal at Petrograd with supplementary factories of arms and ammunition at Briansk, Kiev, and elsewhere. In Italy Turin is the center of the military factories.

The principal arsenals of the United States are at Pittsburgh (Pa.); Augusta (Ga.); Benecia (Cal.); Columbia (Tenn.); Fort Monroe (Va.); Frankford (Pa.); Indianapolis (Ind.); Augusta (Me.); New York (N. Y.); Rock Island (Ill.); San Antonio (Tex.); Watertown (Mass.); and Watervliet (N. Y.). There were also powder depots at St. Louis (Mo.), and Dover (N. J.); a noted armory at Springfield (Mass.), and ordnance proving grounds at Sandy Hook (N. J.) and Aberdeen (Md.).

ARSENIC, (symbol As, at. wt. 75, sp. gr. 5.76), a metallic element of very common occurrence, being found in combination with many of the metals in a variety of minerals. It is of a dark gray color, and readily tarnishes on exposure to the air, first changing to yellow, and finally to black. In hardness it equals copper; it is extremely brittle, and very volatile, beginning to sublime before it melts. It burns with a blue flame, and emits a smell of garlic. It forms alloys with most of the metals. Combined with sulphur it forms orpiment and realgar, which are the yellow and red sulphides of arsenic. Orpiment is the true arsenicum of the ancients. With oxygen arsenic forms two compounds, the more important of which is arsenious oxide or arsenic trioxide (As_2O_3) which is the white arsenic or simply arsenic of the stores. It is used as a flux for glass, and also for forming pigments. The arsenite of copper (Scheele's green) and a double arsenite and acetate of copper (emerald green) are largely used by painters; they are also used to color paper hangings for rooms. Arsenic has been too frequently used to give that bright green often seen in colored confectionery.

ARSINOË (ar-sin'ō-ē), a city of ancient Egypt, on Lake Mœris, said to have been founded about B. C. 2,300, but renamed after Arsinoë, wife and sister of Ptolemy II., of Egypt, and called also Crocodilopolis, from the sacred crocodiles kept at it.

ARSINOË, daughter of Ptolemy I., King of Egypt, born 316 B. C., married at 16 the aged Lysimachus, King of Thrace, whose eldest son, Agathocles, had already wedded Lysandra, her half-sister. Desirous of securing the throne for her own children, Arsinoë prevailed on her husband to put Agathocles to death. Later Lysimachus was slain. In 279, she married her own brother, Ptolemy II. Philadelphus.

ARSON, the malicious and willful burning of a dwelling-house or out-house belonging to another person by directly setting fire to it, or even by igniting some edifice of one's own in its immediate vicinity. If a person, by maliciously setting fire to an inhabited house, cause the death of one or more of the inmates, the deed is murder, and capital punishment may be inflicted. When no one is fatally injured the crime is not capital, but is still heavily punishable; it is a penal offense also to attempt to set a house on fire, even if the endeavor do not succeed.

ART, the power of doing something not taught by nature or instinct; as, to walk is natural, to dance is an art;—power or skill in the use of knowledge; the practical application of the rules or principles of science. A system of rules to facilitate the performance of certain actions; contrivance; dexterity; address; adroitness.

In esthetics, art as distinguished from science consists of the truths disclosed by that species of knowledge disposed in the most convenient order for practice, instead of the best order for thought. Art proposes to itself a given end, and, after defining it, hands it over to science. Science, after investigating the causes and conditions of this end, returns it to art, with a theorem of the combination of circumstances under which the desired end may be effected. After receiving them, art requires whether any or all of those scientific combinations are within the compass of human power and human means, and pronounces the end inquired after obtainable or not. The grounds of every rule of art are to be found in the theorems of science. An art can then only consist of rules, together with as much of the speculative propositions (which lose all their speculative look as soon as they come into the artist's hands) as comprises the justification of those rules. Though art must

assume the same general laws as science does, yet it follows them only into such of their detailed consequences as have led to certain practical rules, and pries into every secret corner, as well as into the open stores of the household of science, bent on finding out the necessities of which she is in search, and which the exigencies of human life demand.

The several arts may be arranged in two groups—(a) the mechanical, and, (b) the liberal or fine arts. The mechanical arts are those which may be successfully followed by one who does not possess genius, but has acquired the facility of working with his hands which long practice imparts. Such are the arts of the carpenter, the blacksmith, the watchmaker, etc. They are often called trades. The liberal or fine arts are such as give scope not merely to manual dexterity, but to genius; as music, painting, sculpture, architecture, etc.

The seven liberal arts, which, in the palmy days of Rome, plebians were not allowed to study, were thus divided: (1) The *Trivium*—viz., grammar, rhetoric, and logic. (2) The *Quadrivium*—viz., arithmetic, music, geometry, and astronomy.

ART, METROPOLITAN MUSEUM OF, the chief art museum of New York City and the largest and most inclusive in the United States. It was established in 1870 and in the following year the State Legislature appropriated $500,000 for a building at Central Park. The first building of the museum was completed in 1879, and the center portion of the Fifth Avenue front was finished in 1902. It was built from designs prepared by Richard Morris Hunt and cost $1,200,000. A further appropriation was made in 1904 for the north part of the Fifth Avenue front. Additional extensions were made in 1907 and in years following. The total cost of the buildings of the museum is about $20,000,000. The museum is governed by a Board of Trustees selected from the Fellows of the institution which compose a corporation. It is administered by a director, secretary, treasurer, and other officials. The city appropriates about $200,000 annually toward its support, while the remainder of the expenses, which amount to about $500,000, are met through contributions and through sums received for admission on certain days.

The museum possesses collections of the first rank. The department of paintings is especially notable for Flemish, Dutch, Old English, French, and American masters. Many of the finest collections of antiquities are housed here. These include the Cesnola collection of Cypriote antiquities; one of the largest Egyptian collections in the world, and many important and representative collections of sculpture, examples of decorative arts, and a notably large and fine collection of medieval armor.

The museum has received from time to time large sums of legacies and bequests. These include Jacob H. Rogers' bequest of about $7,000,000 in 1904, a bequest from Francis L. Leland of $1,000,000 in 1912, a bequest from Frederick T. Hewitt of $1,000,000, and other bequests and gifts from other friends of the institution.

The museum has held many notable exhibitions. Among the most important of these was the Hudson-Fulton Memorial exhibition of Dutch paintings and early memorial art, in 1909. There have also been displayed from time to time important loan collections including those of old masters and other objects of art of J. P. Morgan. Following the death of Mr. Morgan, his son gave to the museum a large portion of the wonderful collections of his father. To house these collections an additional wing was built called the Pierpont Morgan Wing. This was completed in 1918. The museum receives important accessions to its various collections each year. It carries on educational courses and it is yearly visited by an increased number of people. The director from 1910 was Edward Robinson, who succeeded Sir Caspar Purdon Clark.

ARTABANUS (-bā'nus) **IV.**, the last of the Parthian monarchs. Having incited his subjects to revolt, he was captured in 226, and put to death. Thus ended, in the 3d century, the Parthian empire.

ARTABAZUS (-bā'zus), the name of several distinguished Persians under the dynasty of the Achæmenidæ. When Xerxes advanced against Greece, an Artabazus led the Parthians and Chorasmians. Another Artabazus was general under the Persian king, Artaxerxes II., and afterward revolted against Artaxerxes III. For this offense he was forgiven, through the exertions of his brother-in-law, Mentor, a staunch supporter of the next king, Darius, whom we subsequently find Artabazus faithfully attending after the battle of Arbela.

ARTAVASDES (-vas'dēs) I., a King of Armenia, who succeeded his father Tigranes. He joined the Roman forces commanded by Crassus, but deserted to the enemy, causing the defeat of the Romans, and the death of Crassus. He simi-

larly betrayed Mark Antony when engaged against the Medes; but afterward falling into Antony's power, Artavasdes was taken with his wife and children to Alexandria, where they were dragged at the victor's chariot-wheels in golden chains. After the battle of Actium, Cleopatra caused his head to be struck off and sent to the King of Media. Reigned in the 1st century B. C.

ARTAXERXES (-zerks'ēz) I., surnamed Longimanus, was the third son of Xerxes, King of Persia, and, having murdered his brother Darius, ascended the throne 465 B. C. He died in 424 B. C. and was succeeded by his only son, Xerxes. This prince is generally supposed to have been the Ahasuerus of Scripture.

ARTAXERXES II., surnamed Mnemon, was the eldest son of Darius Nothus, and began his reign 405 B. C. His brother Cyrus formed a conspiracy against him, for which he was sentenced to death; but at the intercession of his mother, Parysatis, the sentence was commuted to banishment to Asia Minor. Cyrus repaid this act of clemency by mustering a large army of Asiatics, and some Greek troops under Clearchus, with whom he marched to Babylon; but, being encountered by Artaxerxes, he was defeated and slain. Artaxerxes died at the age of 94, after reigning 46 years.

ARTAXERXES III., succeeded Artaxerxes II., his father, 359 B. C. To pave his way to the succession, he murdered two of his brothers, and afterward put to death all the remaining branches of the family. He suppressed several insurrections, and in Egypt slew the sacred bull Apis, and gave the flesh to his soldiers. For this, his eunuch, Bagoas, an Egyptian, caused him to be poisoned in 339 B. C.

ARTEMIS (ar'te-mis), an ancient Greek divinity, identified with the Roman Diana. She was the daughter of Zeus (Jupiter) and Leto or Latona, and was the twin sister of Apollo, born in the island of Delos. She is variously represented as a huntress, with bow and arrows; as a goddess of the nymphs in a chariot drawn by four stags; and as the moon goddess, with the crescent of the moon above her forehead. She was a maiden divinity, never conquered by love, except when Endymion made her feel its power. She demanded the strictest chastity from her worshippers, and she is represented as having changed Actæon into a stag, and caused him to be torn in pieces by his own dogs, because he had secretly watched her as she was bathing. The Artemisia was a festival celebrated in her honor at Delphi.

ARTEMISIA (ar-tē-mē'zē-a), wormwood; named after Artemis, the Greek goddess, corresponding to the Roman Diana. A genus of plants belonging to the order *asteraceæ*, or composites. It contains four British species, the *A. campestris*, or field southernwood; the *A. vulgaris*, or common mugwort; the *A. absinthium*, or common wormwood; and the *A. maritima*, or sea-wormwood. The common wormwood grows luxuriantly among the sage brush of the Rocky Mountain regions.

ARTEMISIA I., daughter of Lygdamis, and Queen of Caria, who assisted Xerxes in person against the Greeks, and behaved with such valor that the Athenians offered a reward for her capture, and the Spartans erected a statue to her. Lived in the 5th century B. C.

ARTEMISIA II., Queen of Caria, who erected so magnificent a monument to the memory of her husband Mausolus, that every splendid structure of this kind has been since styled a mausoleum. Lived in the 4th century B. C.

ARTEMISIUM, a promontory in Eubœa, an island of the Ægean, near which several naval battles between the Greeks and Persians were fought.

ARTEMUS WARD. See BROWNE, CHARLES FARRAR.

ARTERIOSCLEROSIS, a diseased condition of the arteries, arising in the internal coat as an inflammatory process, and resulting finally in the hardening of the muscular elastic coat. This produces an increase in the quantity of the connective tissue of the walls which results in a contraction of the blood vessels supplying the arteries. As a result these become weakened and easily ruptured. The disease is induced by a sedentary life and by overeating and drinking. In recent years it has become steadily more prevalent.

ARTERY (from *aer*=air, and *tereo*=to watch over; *teros*=a watch, a guard. So called because the ancients, finding that, in the dead bodies which they examined, the arteries were empty of blood, formed the idea that they were designed for the circulation of air through the system. The arteries are long, cylindrical tubes, with three coats, an external tunic commonly called the cellular coat, a middle or fibrous tunic or coat, and an epithelial tunic. The coating of the arteries is very elastic. The

largest arteries which leave the heart are the aorta and the pulmonary artery; both spring from the base of the heart in front. They branch and anastomose to a large extent. The contractility of the arteries forces the blood to the extremities from the heart, the valves of which prevent its return.

ARTESIAN WELLS, deep wells bored through impervious rock strata to a porous water bearing rock stratum whence the water flows to the surface and is discharged from the bore. The principal condition of an artesian well is a pervious stratum protected above and below by a water-tight bed. These layers come to the surface in some elevated region where they get their rain flow, then pitch downward to a considerable depth and then rise again, thus forming a great basin which retains the water. Rain water and surface water fill the porous stratum to the brim. If it be tapped any, the water will rise in the bore and be discharged as long as the supply equals the demand. The whole Mississippi valley is ideally adapted for wells of this kind. The Chinese and Egyptians were early acquainted with artesian wells. The oldest known in Europe is at Lillers, in Artois (hence the name artesian), and was sunk in 1126. In 1836, the first artesian well was dug in the eastern Sahara and at a depth of nearly 200 feet struck water which poured forth 4,500 liters a minute. In 1860 there were 50 wells, averaging 735 liters a minute. In the province of Constantine alone there are more than 150. The result is proving beneficial not only to the country materially, but also to the character and habits of its nomadic Arab inhabitants. Several tribes have already settled down around these wells, and, forming thus the centers of settlements, have constructed villages, planted date palms, and entirely renounced their previous wandering existence. The earliest exploration for artesian water in Colorado was at Kit Carson Station on the Kansas Pacific railroad. It was sunk to a depth of 1,300 feet without obtaining water. In 1879, a well was drilled for petroleum at South Pueblo, in the Arkansas valley. At a depth of 1,180 feet a flow of mineral water (82°) was struck yielding 160,000 gallons per 24 hours. Subsequently thousands of wells were dug in Colorado. It was found that Denver was underlaid by a body of artesian water. The American Desert, which includes one-fifth of the total area of the United States, has deep artesian wells which were bored for the purpose of irrigation, and which have transformed the whole region.

The most famous artesian well, perhaps, is that of Grenelle, near Paris, which was bored in 1833-1841, and whose water is brought from the Gault at a depth of 1,798 feet. It yields 516½ gallons of water per minute.

Artesian wells have supplied a portion of the data upon which the internal temperature of the earth has been calculated. Thus the Grenelle well has a temperature of 81° F., while the mean temperature of the air in the cellar of the Paris observatory is only 53°. MM. Arago and Walferdin observed the temperature as the work proceeded, and found that there was a gradual and regular increase downward. Walferdin also made a series of very accurate and careful observations on the temperature of two borings at Creuzot, within a mile of each other, commencing at a height of 1,030 feet above the sea, and going down to a depth, the one of 2,678 feet, the other about 1,900 feet. The results, after every possible precaution had been taken to insure correctness, gave a rise of 1° F. for every 55 feet down to a depth of 1,800 feet, beyond which the rise was more rapid, being 1° for every 44 feet of descent; but at Fort Randall the temperature at 80° increased at the rate of 1° every 17½ feet. It was once supposed that water from artesian wells was purer than from ordinary wells; but it is found to be a mistake. The lower the water goes, the more impregnated it is with saline and other matter.

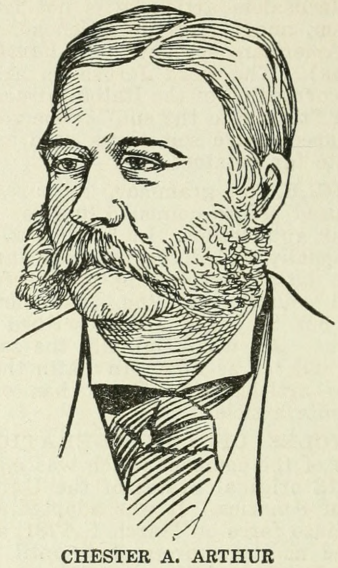
ARTEVELD, or **ARTEVELDE** (ar'te-velt, ar'te-vel-de), the name of two men distinguished in the history of the Low Countries. (1) JACOB VAN, a brewer of Ghent, born about 1300; was selected by his fellow townsmen to lead them in their struggles against Count Louis of Flanders. In 1338 he was appointed captain of the forces of Ghent, and for several years exercised a sort of sovereign power. A proposal to make the Black Prince, son of Edward III., of England, governor of Flanders led to an insurrection, in which Arteveld lost his life (1345). (2) PHILIP, son of the former, at the head of the forces of Ghent, gained a great victory over the Count of Flanders, Louis II., and for a time assumed the state of a sovereign prince. His reign proved short-lived. The Count of Flanders returned with a large French force. Arteveld was rash enough to meet them in the open field at Roosebeke, between Courtrai and Ghent, in 1382, and fell with 25,000 Flemings.

ARTHRITIS, any inflammatory distemper that affects the joints, particularly chronic rheumatism or gout.

ARTHROPODA, a subdivision of the *annulosa*, or *articulata*, containing the classes belonging to that sub-kingdom which are of the highest organization. The body is very distinctly divided into rings or segments, sometimes, as in the *myriapoda* (centipedes and millepedes), mere repetitions of each other, but more frequently with some of them differentiated for special ends. In general, the head, thorax, and abdomen are distinct. Under the subdivision arthropoda are ranked in an ascending series the classes *miriapoda*, *crustacea*, *arachnida*, and *insecta*.

ARTHUR, a prince of the Silures, and King of Britain in the time of the Saxon invasions in the 5th and 6th centuries. He was the son of Uther Pendragon and Igerne, wife of Gorlois, Duke of Cornwall, and was elected King of Britain at the age of 15. He immediately declared war against the Saxons in the north of England, and defeated them so completely, that in one battle alone, it is said, he slew 500 Saxons with his own sword, the famous Calibur. He subdued the Picts and the Scots, and also Ireland and Iceland. After a long peace, during which he married the fair Guinevere, Arthur conquered Gaul and Norway, and even fought against the Muscovite hordes. On the Romans demanding tribute, he crossed into Gaul, and defeated them in a mighty battle. Recalled to England by the revolt of his nephew, Modred, allied to the Scots and Picts, Arthur fought against him in Cornwall, his last battle, in which Modred was slain, and Arthur himself mortally wounded. He was buried at Glastonbury. It was long believed by his countrymen that he was not dead, but carried to fairyland, and that he would yet reappear, and, with his mighty sword, again lead them to victory over their enemies. The existence and exploits of Arthur and of his paladins, the Knights of the Round Table, have been for ages the theme of minstrels and poets, examples of which are the famous "Morte d'Arthur" and the "Idylls of the King."

ARTHUR, CHESTER ALAN, 21st President of the United States, born in Fairfield, Vt., Oct. 15, 1830; was the son of Scottish parents, his father being pastor of Baptist churches in Vermont and New York. He chose law as a profession, and practiced in New York. As a politician, he became a leader in the Republican party. During the Civil War he was energetic as quartermaster-general of New York in getting troops raised and equipped. He was afterward collector of customs for the port of New York. In 1880 he was elected Vice-President, succeeding as President on the death of James A. Garfield, in 1881, and in this office he gave general satisfaction. He died in New York City, Nov. 18, 1886.



CHESTER A. ARTHUR

ARTHUR, JULIA, an American actress, born in Hamilton, Ont., in 1869. She made her first professional appearance in "Richard III." and for three seasons played Shakespearean rôles. Her first New York success was at the Union Square Theater in "The Black Masque." She later took the leading part in several successful plays and was received with equal favor in America and England. She played in Henry Irving's company with Ellen Terry. In 1898 she married Benjamin C. Cheney, Jr., and retired temporarily from the stage, to which, however, she has returned from time to time with considerable success.

ARTICHOKE, a plant belonging to the order *asteraceæ*, or composites, the suborder *tubuliferæ*, and the section *carduineæ*, the same to which the thistles belong. It considerably resembles a huge thistle. The receptacle on which the florets are situated, and the fleshy bases of the scales are eaten. The modern Arabs consider the root as aperient, and the gum, which they term

kunkirzeed, as an emetic. Artichokes were introduced into England early in the 16th century.

The Jerusalem artichoke is not from Jerusalem, and is not an artichoke. It is an American sunflower (*helianthus tuberosus*). The word Jerusalem arose from a corruption of the Italian *girasole*, meaning "turner to the sun." The roots of this species are sometimes used as a substitute for potatoes.

ARTICLE, in grammar, a part of speech used before nouns to limit or define their application. In English *a*, or *an*, is usually called the indefinite article (the latter form being used before a vowel sound), and *the*, the definite article, but they are also described as adjectives. *An* was originally the same as *one*, and *the* as *that*. In Latin there were no articles, and Greek has only the definite article.

ARTICLES OF CONFEDERATION, the title of the compact which was made by the 13 original States of the United States of America. It was adopted and carried into force on March 1, 1781, and remained as the supreme law until the first Wednesday of March, 1789.

ARTICLES OF WAR, a code of laws for the regulation of the military forces of a country. Those of Great Britain and Ireland were issued prior to 1879, in pursuance of the annually renewed mutiny act. In 1879 the army discipline act consolidated the provisions of the mutiny act with the articles of war. This act was amended in 1881, and now the complete military code is contained in the army act of 1881. In the United States, the articles of war form an elaborate code, thoroughly revised in 1880, but subject at all times to the legislation of Congress.

In 1911, the articles were again revised, but no important changes were made. The purpose was to bring the military courts in harmony with the civil courts. Provision was made for the transfer of military delinquents from the civil to the military courts, etc.

ARTICLES, THE THIRTY-NINE, of the Church of England, a statement of the particular points of doctrine, 39 in number, maintained by the English Church; first promulgated by a convocation held in London in 1562-1563, and confirmed by royal authority; founded on and superseding an older code issued in the reign of Edward VI. The five first articles contain a profession of faith in the Trinity; the incarnation of Jesus Christ, His descent to Hell, and His resurrection; the divinity of the Holy Ghost. The three following relate to the canon of the Scripture. The 8th article declares a belief in the Apostles', Nicene, and Athanasian creeds. The 9th and following articles contain the doctrine of original sin, of justification by faith alone, of predestination, etc. The 19th, 20th, and 21st declare the Church to be the assembly of the faithful; that it can decide nothing except by Scriptures. The 22d rejects the doctrine of purgatory, indulgences, the adoration of images, and the invocation of saints. The 23d decides that only those lawfully called shall preach or administer the sacraments. The 24th requires the liturgy to be in English. The 25th and 26th declare the sacraments effectual signs of grace (though administered by evil men), by which God excites and confirms our faith. They are two: baptism and the Lord's Supper. Baptism, according to the 27th article, is a sign of regeneration, the seal of our adoption, by which faith is confirmed and grace increased. In the Lord's Supper, according to article 28th, the bread is the communion of the Body of Christ, the wine the communion of His Blood, but only through faith (article 29); and the communion must be administered in both kinds (article 30). The 28th article condemns the doctrine of transubstantiation, and the elevation and adoration of the Host; the 31st rejects the sacrifice of the mass as blasphemous; the 32d permits the marriage of the clergy; the 33d maintains the efficacy of excommunication. The remaining articles relate to the supremacy of the king, the condemnation of Anabaptists, etc. They were ratified anew in 1604 and 1628. All candidates for ordination must subscribe these articles.

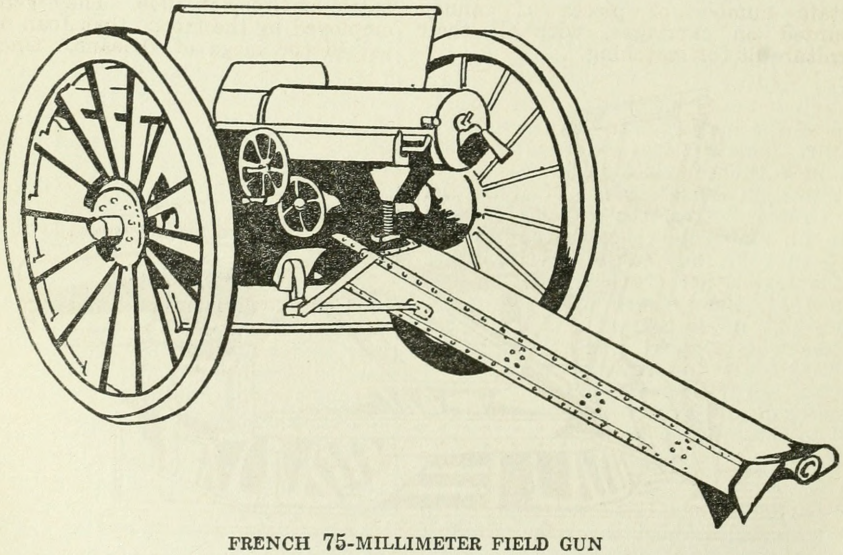
ARTICULATA, Cuvier's name for the third great division or sub-kingdom of animals. The species so designated have their bodies divided into rings, with the muscles attached to their interior. Their nervous system consists of two cords extending along the under part of their body, and swelled out at regular intervals into knots or ganglia. One of these is the brain, which is not much larger than the other ganglia.

ARTICULATION, in anatomy, a joint; the joining or junction of the bones. This is of three kinds: (1) Diarthrosis, or a movable connection, such as the ball-and-socket joint; (2) Synarthrosis, immovable connection, as by suture, or junction by serrated margins; (3) Symphysis, or union by means of another substance, by a cartilage, tendon, or ligament.

ARTIFICIAL FLOWERS, products of an industry which has been carried to a wonderful degree of perfection, the imitation of natural flowers being so exact as to mislead even artists. The French excel in the manufacture of these pretty frivolities. This industry has been successfully carried on in the United States, where a large number of girls are constantly employed in making artificial flowers.

ARTIFICIAL LIMBS, substitutes for human arms and legs, and parts thereof, the manufacture of which has received the attention of surgeons and mechanics from a very early date. In the great work on surgery, by Ambrose Paré, in 1579, he refers to, and gives detailed illustration of, an artificial arm and leg, and although the construction was of a rude character, they showed a very good attempt to conceal the mutilation. In 1696 an artificial leg was invented by Verduin, a Dutch surgeon. James Potts, of England, patented a new leg Nov. 15, 1800. This soon became celebrated as the "Anglesea leg," because it was so long worn by the Marquis of Anglesea. An improvement on this leg was patented by William Selpho, who was the first manufacturer of note in New York, where he established himself in 1839. The perfection to which limbs have been brought is wonderful and very interesting. A person with two artificial legs can walk so perfectly as to avoid detection, and a person with a single amputation can almost defy detection. Notable improvements in artificial limbs, and more particularly in legs, were made by C. A. Frees, of New York. One of these improvements, and one of the most important, consists in the movements of the knee and ankle joints, by which the whole limb is strengthened and made more durable. An important feature of this piece of mechanism consists in the introduction of a universal motion at the ankle-joint, imitating the astragalus movement with an additional joint, and thus producing a most perfect artificial substitute. The World War (1914-1918) created an unprecedented demand for artificial limbs, and the inventors, especially American, provided a variety of ingenious contrivances too numerous to describe. Artificial arms and hands are so constructed as to enable a person to grasp and hold objects, control movements, and perform most of the operations of the real arm. Artificial legs also show improvement, being light in weight, easily controlled, enabling a cripple to walk with ease and even grace.

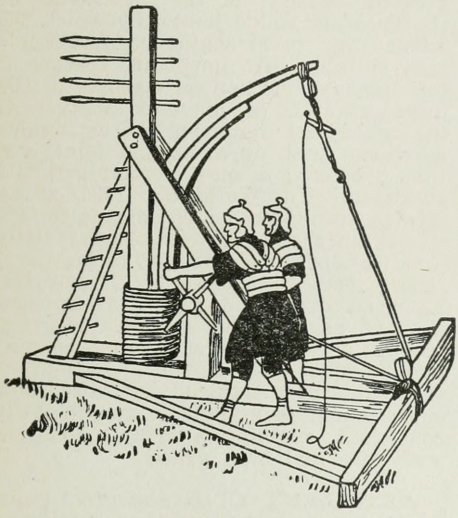
ARTILLERY, all sorts of great guns, cannon, or ordnance mortars, howitzers, machine-guns, etc., together with all the apparatus and stores thereto belonging, which are taken into the field or used for besieging and defending fortified places. It is often divided into (1) horse artillery; (2) field artillery; and (3) garrison artillery.



FRENCH 75-MILLIMETER FIELD GUN

Field artillery is artillery designed to be taken with an army to the field of battle; a park of artillery is artillery

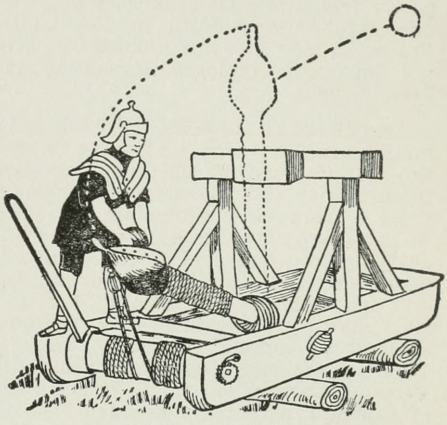
with the carriages, horses, and stores of all kinds necessary for its effective use; siege artillery is artillery of heavy metal designed to be employed in breaching



A ROMAN DEVICE FOR SHOOTING FOUR ARROWS AT ONCE

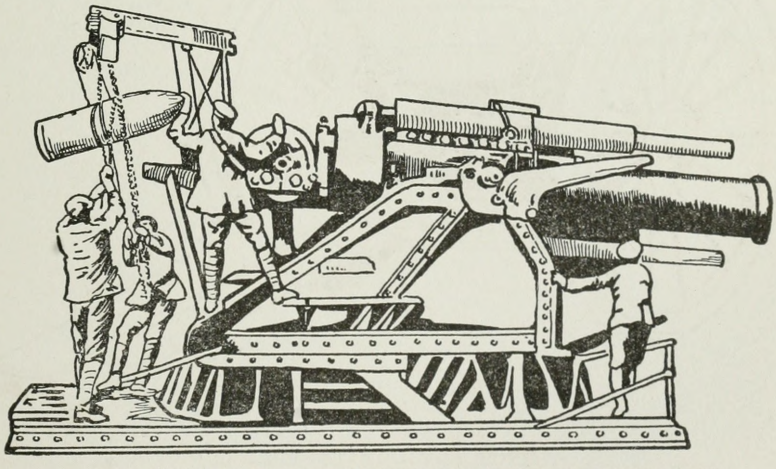
fortifications; a train of artillery is a certain number of pieces of cannon mounted on carriages, with all their furniture fit for marching.

ling force is gas. This definition of artillery excludes the mechanical devices by which, in the days of Archimedes and the Romans, missiles were projected to a considerable distance by mechanical means as the ballista. The discovery of



ROMAN CATAPULT

gunpowder in the 13th century made possible the engines of destruction that to-day are the chief reliance of armies. Several crude cannon were used at the battle of Crecy in 1346. They were also employed by the troops that Joan of Arc led to the siege of Orleans. Once the

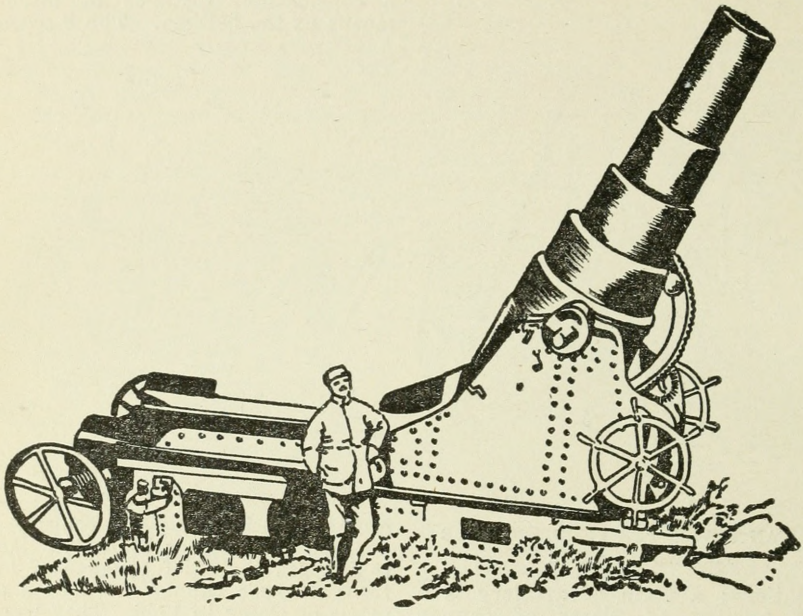


BRITISH 9.2″ HOWITZER, MOUNTED ON SEMI-PERMANENT BASE

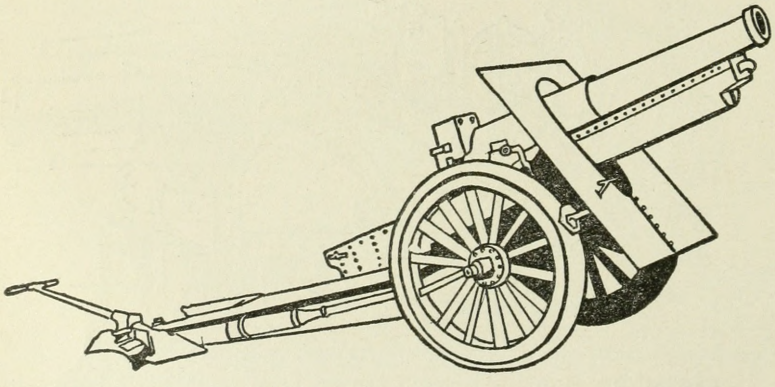
The name artillery is also given to the land troops by whom these arms are served, whether they accompany an army in the field, take part in sieges, or occupy fixed posts.

Technically speaking, artillery includes all projectile weapons whose propel- idea was grasped and the possibilities of the new arm demonstrated, developments were rapid. Its use spread through all Europe in the 16th century, but it was not until the 17th that its value in warfare was measurably utilized by Gustavus Adolphus in the Thirty Years'

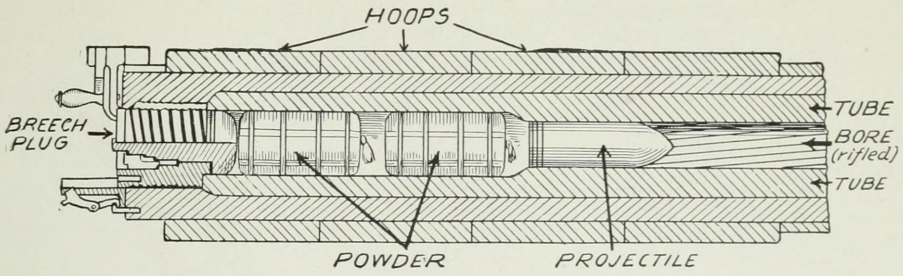
War. Napoleon used it with telling effect in his campaigns, and laid especial stress upon the concentration of artillery fire. The most important modern improvements in artillery, besides the increase in size, is the general adoption of rifled ordnance, breech-loaders, and machine-guns. Throughout the 19th century the Great Powers increasingly worked on the improvement of their respective artilleries. Great Britain, as a result of its many colonial wars, continuously improved both its military and naval artillery. The Franco-Prussian war of 1870-1871 and the resulting rivalry between France and Germany resulted in many other important improvements. Austria-Hungary, Italy, Russia, Japan, Switzerland, and the United States each strove to perfect its own artillery and to meet its special requirements. In the World War the use of artillery was on a scale unparalleled up to that time. The Germans and Austrians with their great gun works at Essen and Skoda had a great preponderance over the Allies in heavy guns. The forts at Namur, Liège, Antwerp, and Maubeuge crumbled up like paper before the attack of the monster



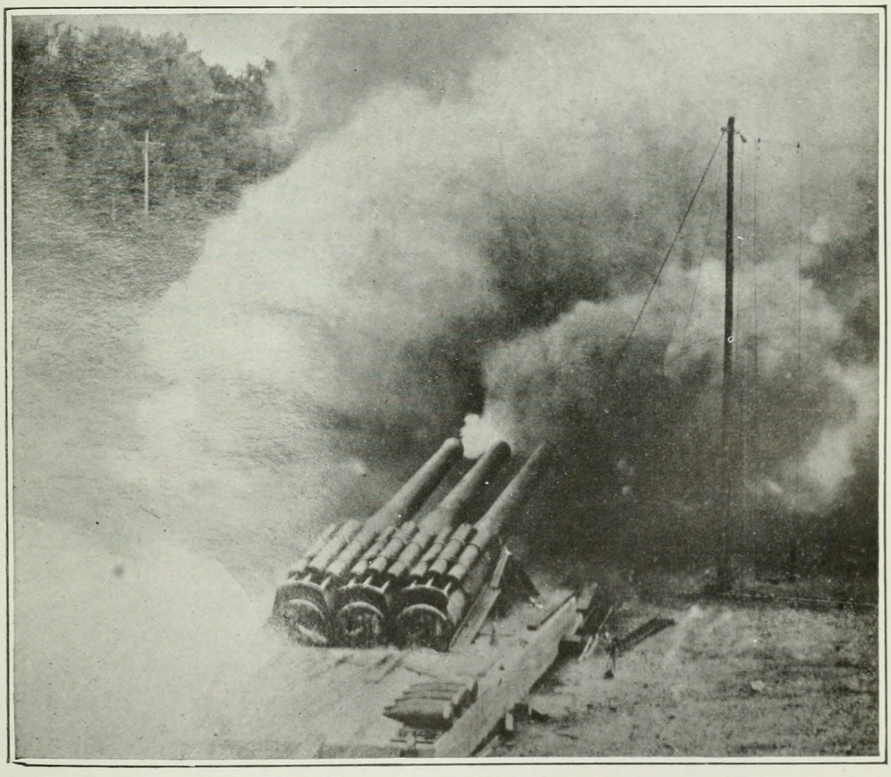
ITALIAN 16″ MORTAR



155-MILLIMETER HOWITZER

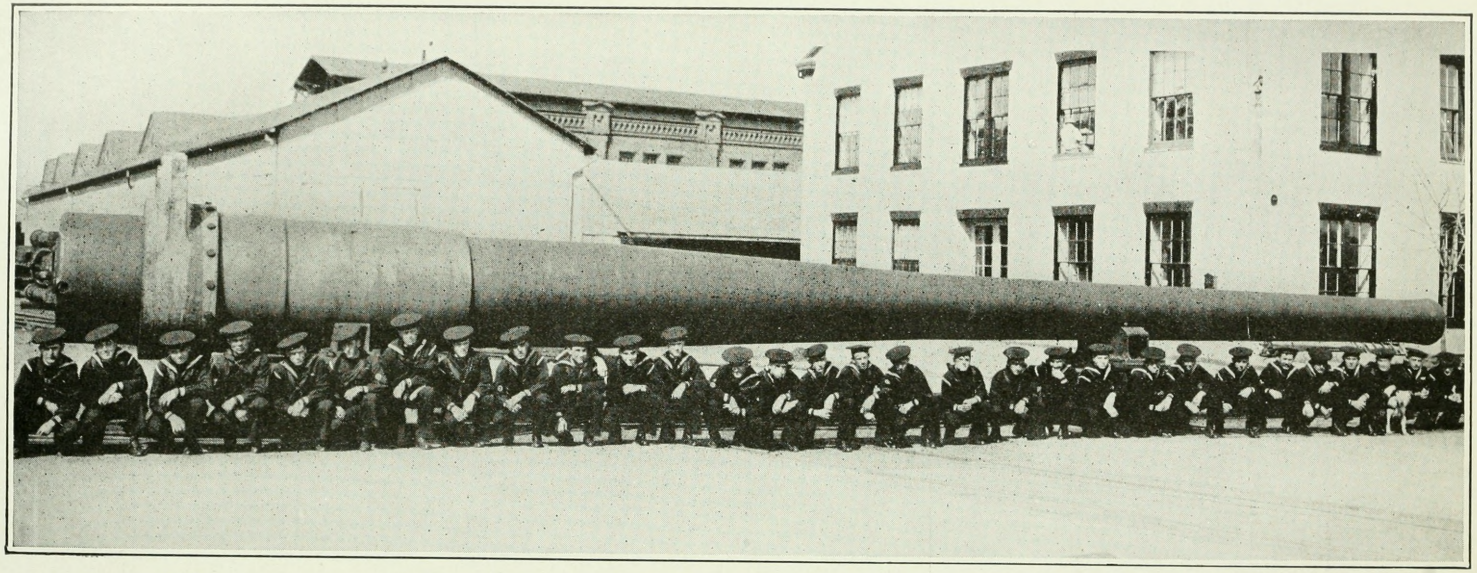


ARTILLERY, PLATE A, FIGURE 1.—A BUILT-UP, RIFLED GUN, SHOWING DETAILS OF CONSTRUCTION, POWDER CHARGE, AND PROJECTILE

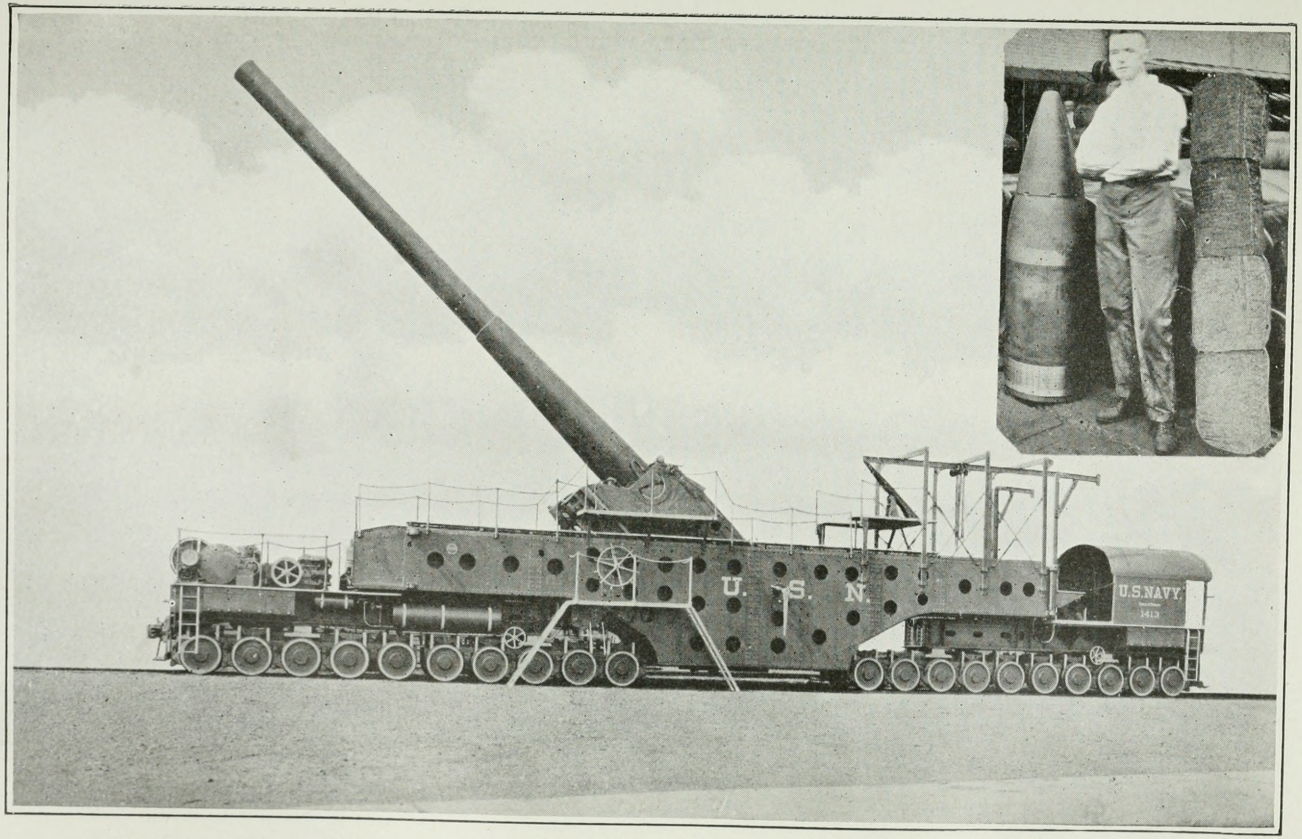


ARTILLERY, FIGURE 2.—THREE 14-INCH GUNS IN A TRIPLE MOUNT, FIRING SIMULTANEOUSLY

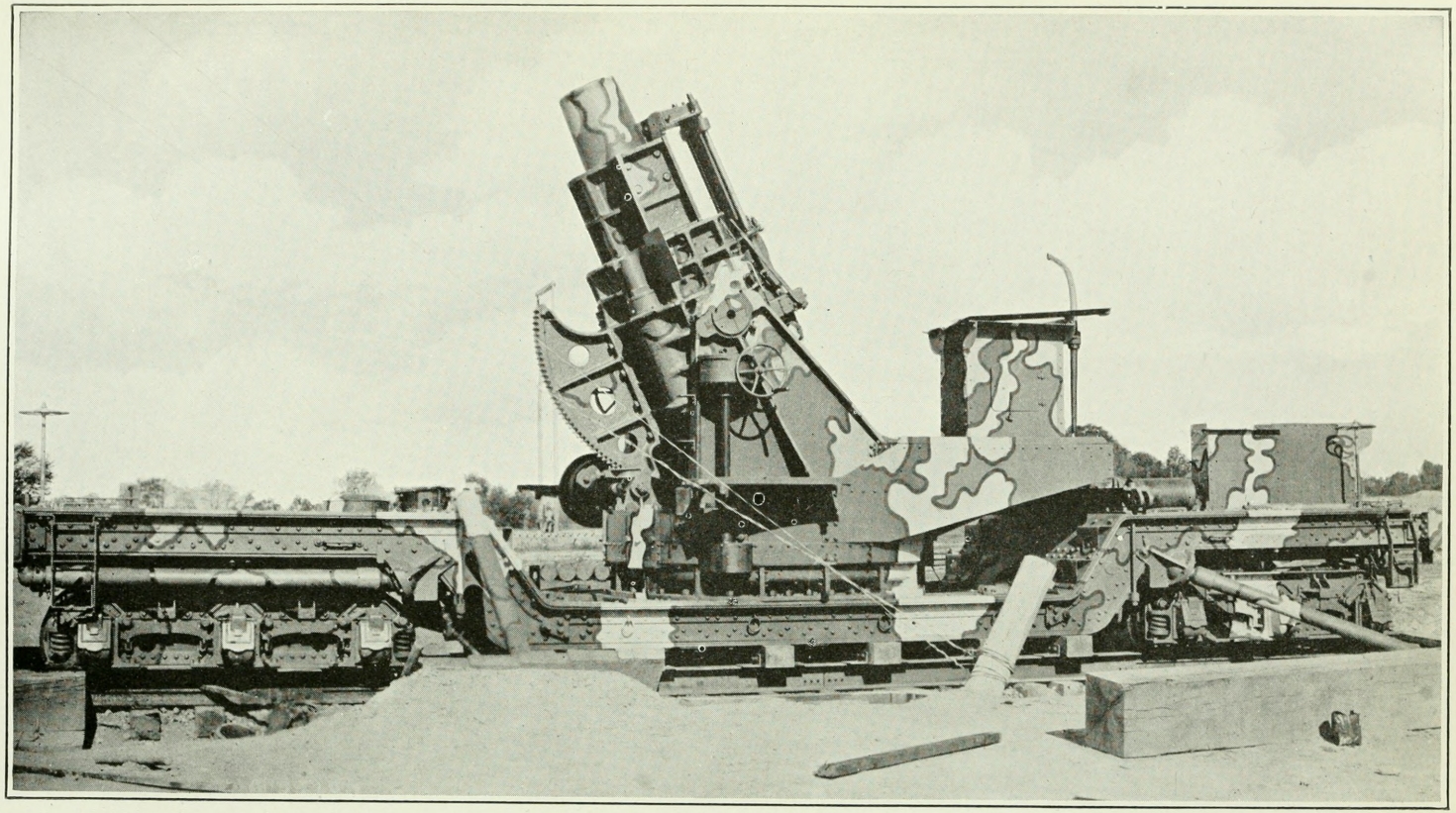
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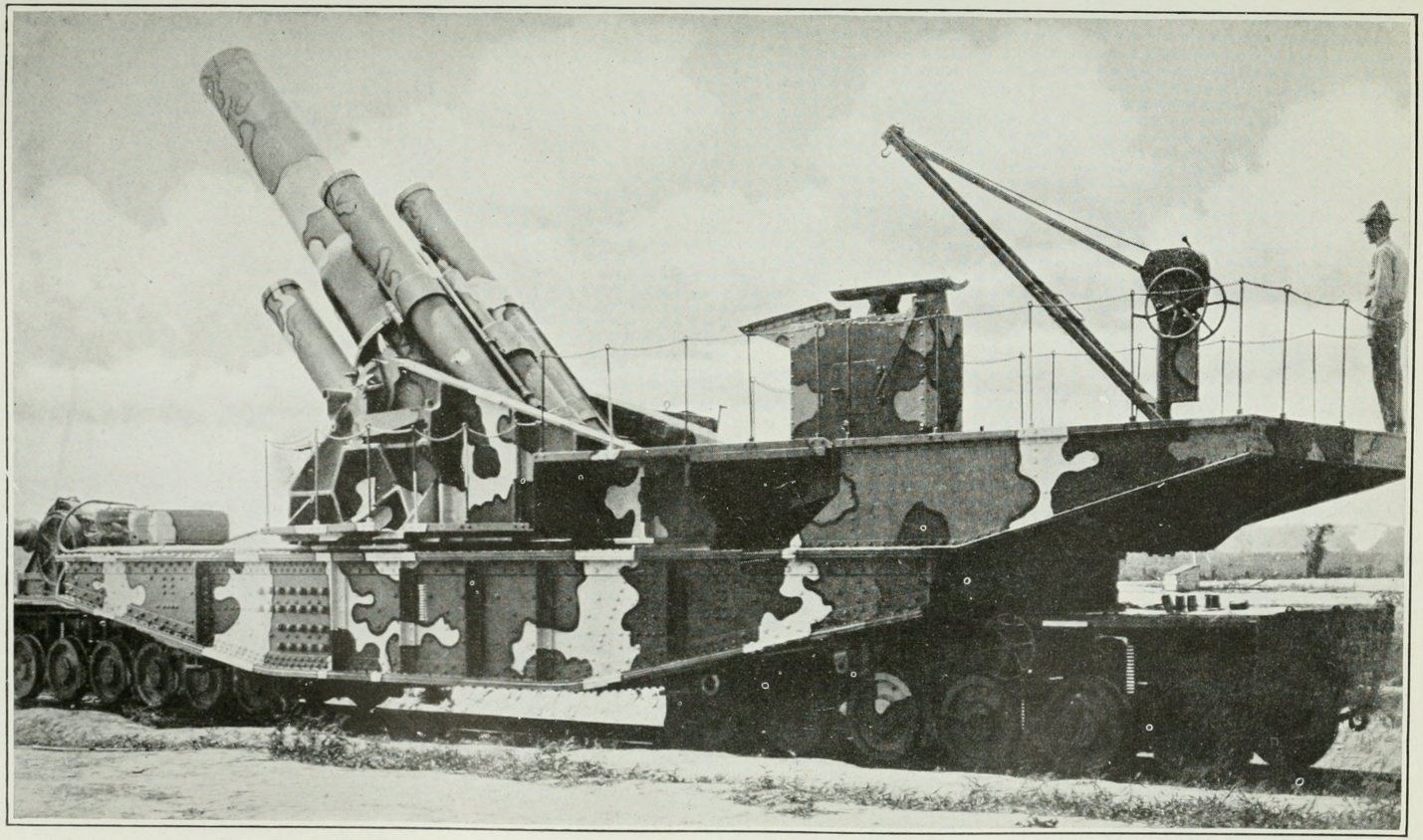
ARTILLERY, PLATE B.—THE 14-INCH NAVAL GUN, MORE THAN SEVENTY FEET LONG.
THE 16-INCH GUN FOR BATTLESHIPS IS ABOUT EIGHTY FEET LONG



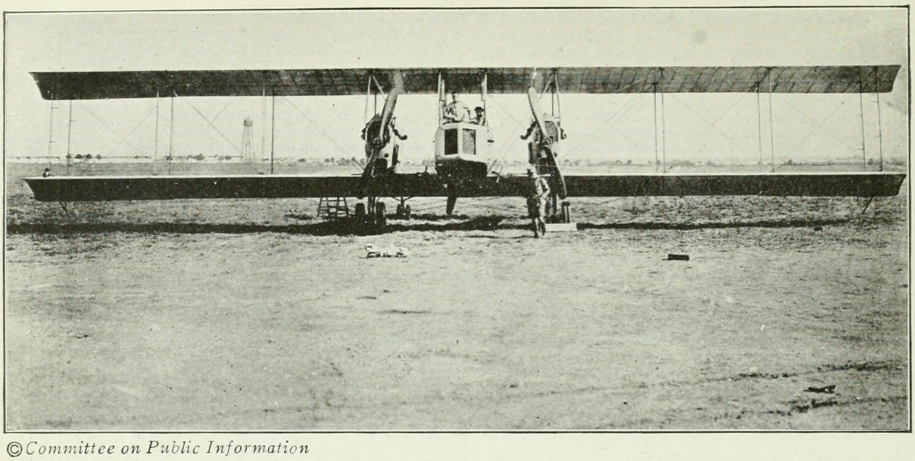
ARTILLERY, PLATE C.—14-INCH U. S. NAVAL GUN, AS USED ON THE FRENCH FRONT IN 1918. IN THE UPPER RIGHT-HAND CORNER ARE THE SHELL AND THE POWDER CHARGE



ARTILLERY, PLATE D.—12-INCH U. S. ARMY MORTAR GUN, RAILWAY MOUNTED

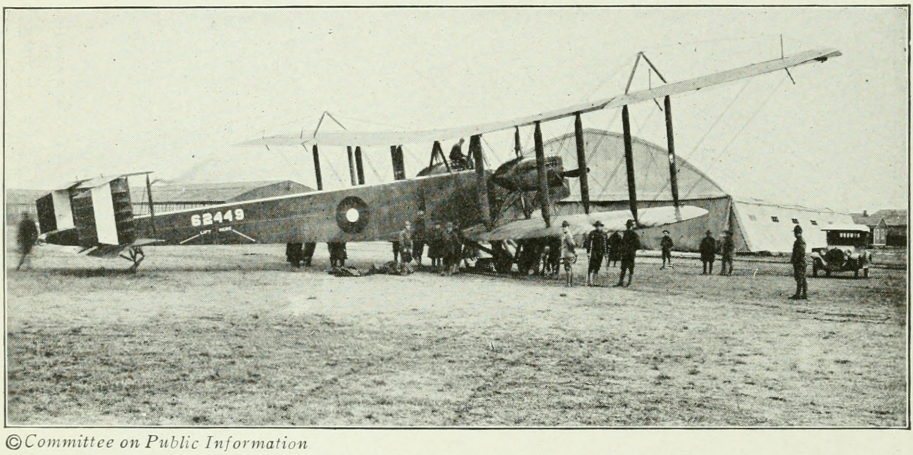


ARTILLERY, PLATE E.—UNITED STATES 16-INCH ARMY HOWITZER, RAILWAY MOUNTED. THE PROJECTILE WEIGHS 1,600 POUNDS



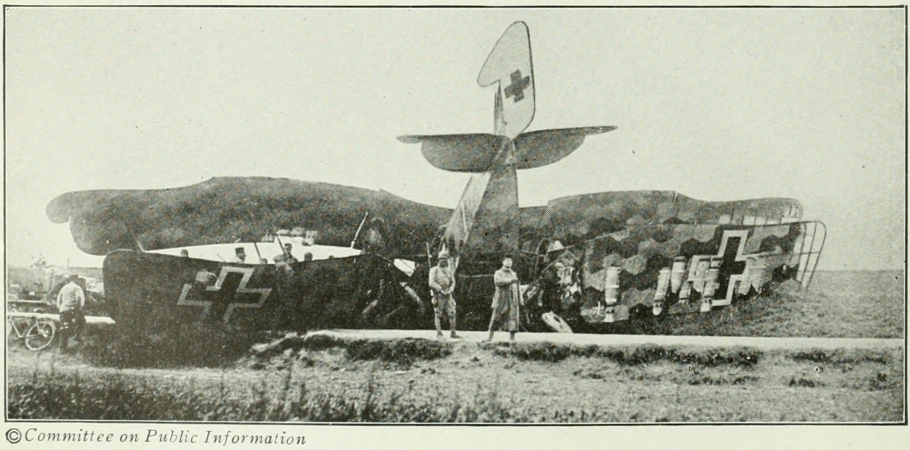
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AN ITALIAN CAPRONI BOMBING AIRPLANE



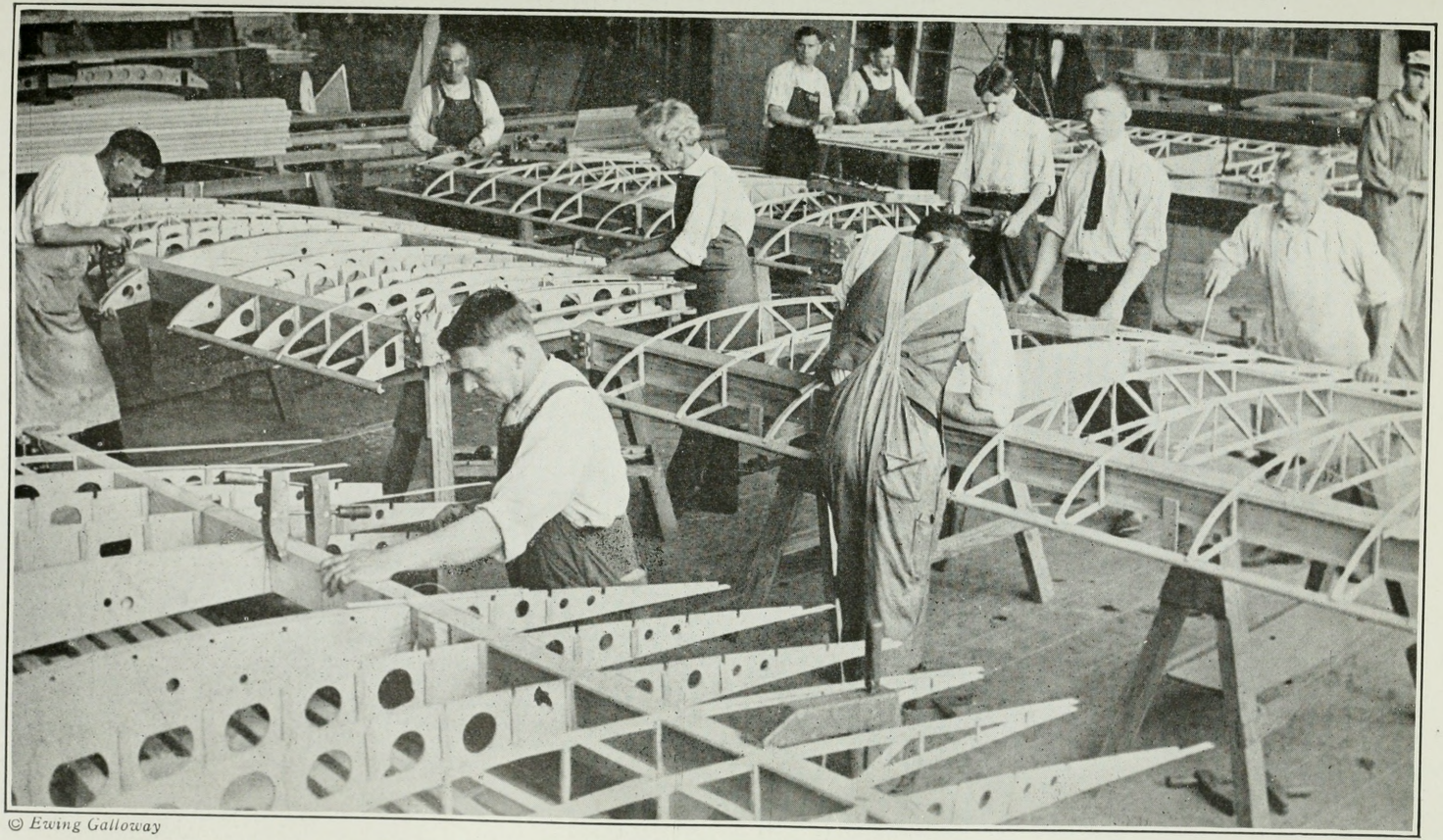
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A BRITISH HANDLEY-PAGE BOMBING AIRPLANE



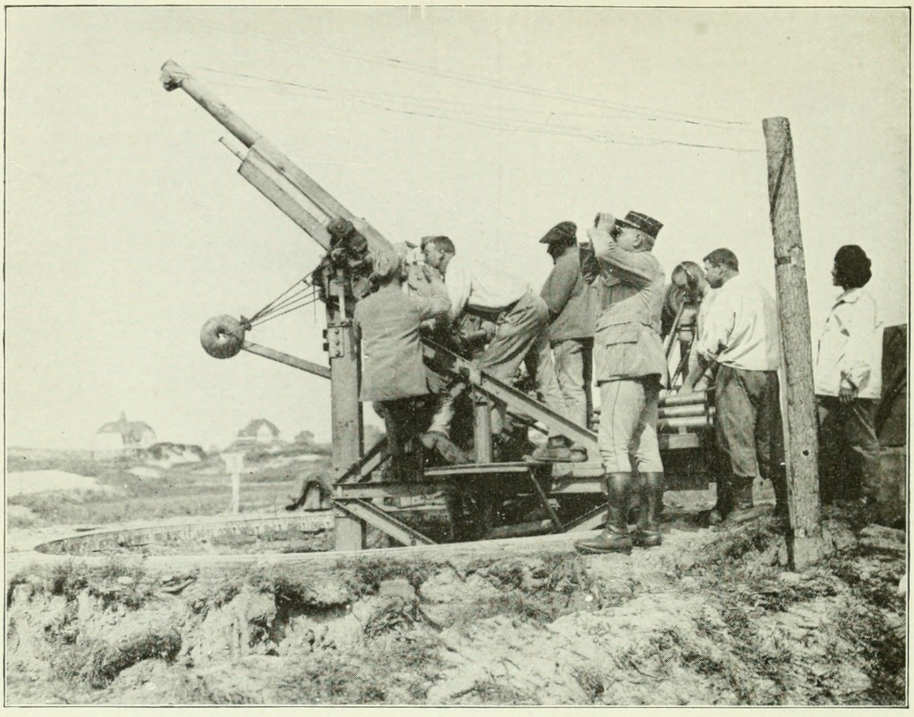
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A FIVE-MAN GERMAN GOTHA BROUGHT DOWN BY AMERICAN ANTI-AIRCRAFT FIRE

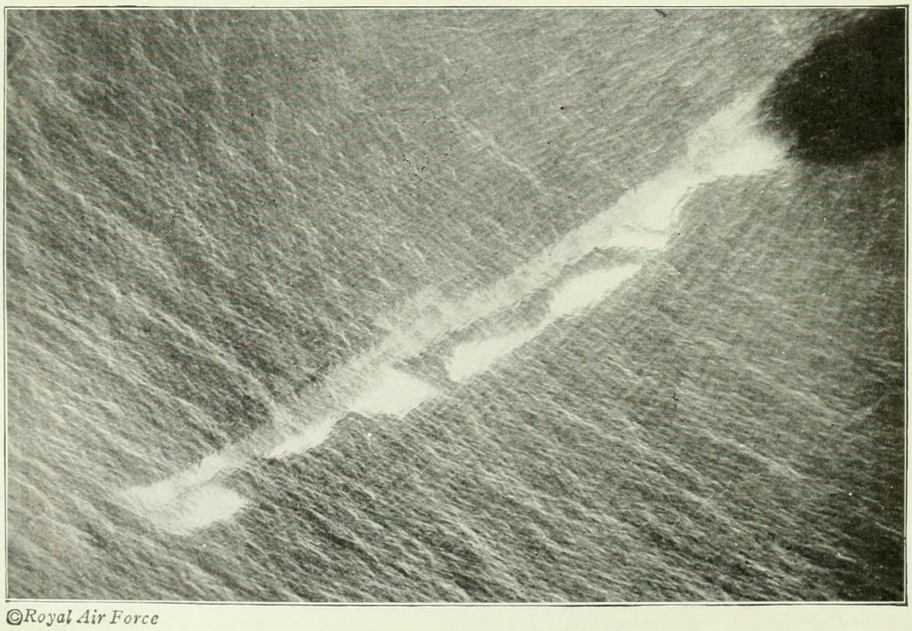


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ASSEMBLING AIRPLANE WINGS IN AN OHIO FACTORY. THE CUTTING AND JOINING ARE DONE WITH GREAT CARE



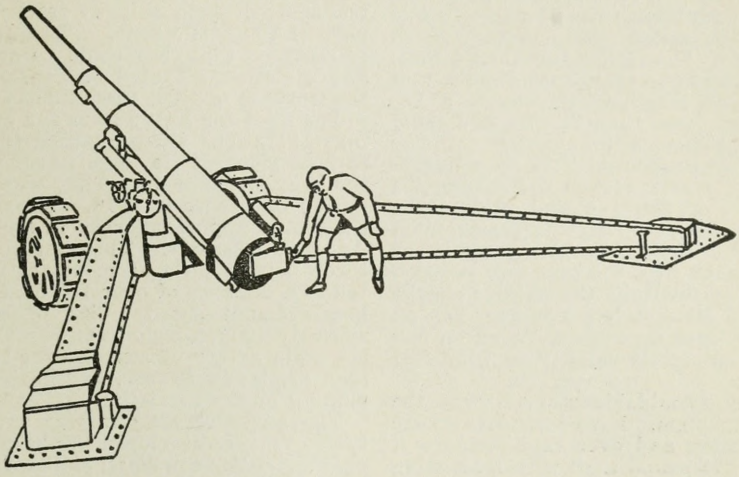
AN ANTI-AIRCRAFT 75-MILLIMETER GUN



©*Royal Air Force*

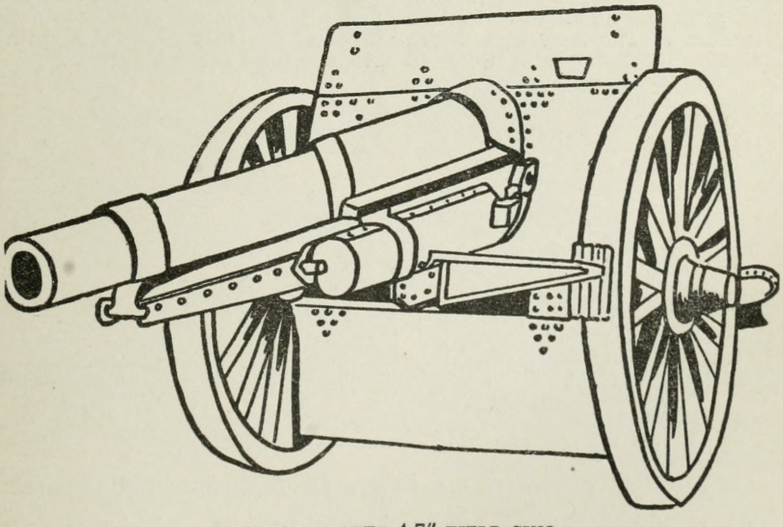
A SUNKEN SHIP, 30 YARDS DOWN, AS SEEN FROM AN AIRPLANE

42-centimeter guns. These were supplemented by other heavy guns of 28-cm. and 35-cm. and constituted the heaviest siege artillery hitherto employed in warful as that of Germany at the beginning of the war, but the disproportion steadily decreased as the conflict went on. The French, however, had two admirable



155-MILLIMETER GUN, WITH DIVIDED TRAIL (FRENCH MODEL, 1918)

fare. The next class in size and power was their heavy army artillery with 13, 15, and 19 centimeter caliber, having a range of between 10 and 12 miles. Lighter than these were the corps artillery pieces, of which the 105 and 150 pieces in their 75-mm. and their 155-mm. guns. The former was the most useful piece employed by either side. It threw projectiles weighing between 12 and 16 pounds to a distance of 5½ miles. It was mobile, light, and worked with re-



UNITED STATES 4.7″ FIELD GUN

mm. howitzers were the types. These latter were the more mobile, and were able to follow or accompany the infantry to any desired position.

The Allied artillery was not as powermarkable speed and precision. A recoil mechanism, with which it is provided, allows a certain retrogade movement of the gun and then returns it to position for the next shot. Instead of being

pointed each time it is fired, it needs only to be sighted at its target at the beginning of the action and can repeat the shot indefinitely.

The French 155-mm. howitzer was worthy to rank with the 75-mm. It was perhaps the finest specimen of French gunmaking. It weighed less than 4 tons, and thus could be transported quickly to any desired location. It threw a 95-pound shell more than 7 miles and could fire several times a minute. Its rapidity of action was made possible by a hydropneumatic recoil system that supports the barrel of the gun and utilizes the energy of the recoil by the compression of air. In less than thirteen seconds the mechanism throws the gun into position again. The shell and the powder charge are loaded separately. The gun has an extremely light carriage to favor its mobility. The muzzle velocity is 2,400 feet a second.

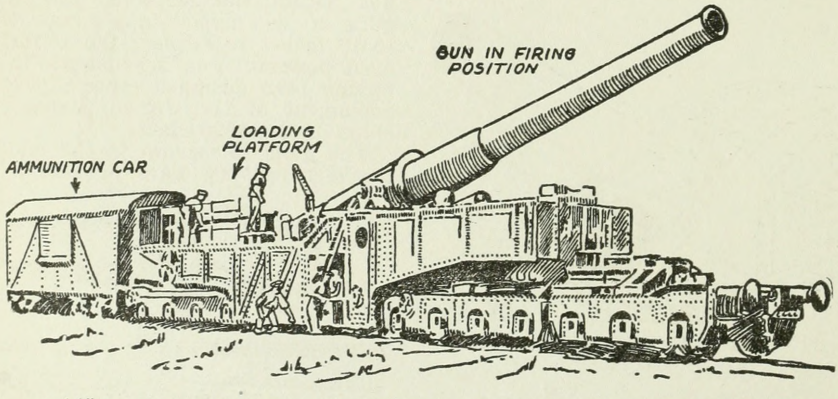
Another formidable weapon was the French 240-mm. howitzer. Its range was 10 miles, and over that distance it hurled a 356-pound shell with a bursting charge of 50 pounds of high explosive. Although about the size of the British 9.2-inch howitzer, it was far more powerful than the latter, whose range was 6 miles and whose projectile weighed from 200 to 290 pounds.

The American 4.7-inch field gun also proved an admirable weapon. It carried a 60-pound projectile 4½ miles and with a 45-pound projectile an additional mile's range is secured. The American 6-inch gun carried to a distance of over 10 miles, while the 5-inch had a maximum range of 9 miles. They were very successful in destroying the 77-mm. guns of the enemy.

The great railway-mounted mortars were one of the most striking developments of the war. The giant guns were of 12, 14, and 16 inch size. The mounting of these on railway carriages gave them the rigidity necessary on account of their size and weight, and also secured great mobility, as they were able to be transported along railway tracks to any part of the battle zone. The guns were so mounted that they could be swung in any direction, elevated or depressed, by the working of their mechanisms.

The need for heavy guns for our military operations abroad caused the Navy to lend some of its huge naval guns to the War Department. They were transported to France in 1918, and arrived in time to do important work in the Meuse-Argonne offensive. They were able to throw a projectile of more than half a ton to a distance of over 16 miles. Their bombardment cut the line of the Mézières-Longuyon-Sedan railway that was the main artery of supplies for the German armies in France, and hastened the signing of the armistice.

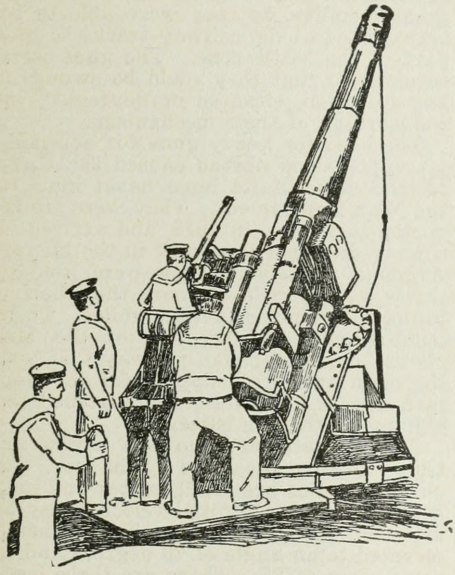
The anti-aircraft gun was a new artillery feature developed by the war. Its characteristics are small caliber and long bore, so that high initial velocity may be attained. They are capable of being elevated to an angle of 70 degrees and in some cases of 75. There are three leading types, designed respectively for field work, for mounting on automobiles, and for use on ships. This latter has a central pivot base that enables it to be turned rapidly in all directions. A range-finder is employed to ascertain the distance of the target and a sighting telescope is used for taking aim.



A 14″ RAILWAY GUN, WHICH CAN HURL A 1,200-LB. PROJECTILE 18 MILES

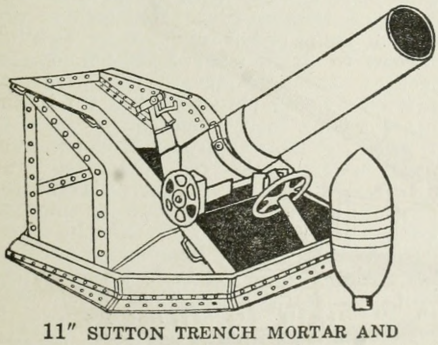
Various kinds of charges are used. Shrapnel had its advantage because of its wide range of action, but in actual practice it has been found in firing at a balloon that the slight wounds inflicted by the fragments are not serious enough to bring down the quarry.

Shrapnel therefore has been largely supplanted by a grenade which pierces the envelope and explodes inside, thus set-



BRITISH 6″ ANTI-AIRCRAFT GUN

ting the balloon in flames. The trail of the grenade is made by a special smoke that accompanies the projectile by day and leaves a faint white wake at night. In this way the gunner is able to see how nearly he has to come to the mark. In the case of field guns, the caliber is 2.6



11″ SUTTON TRENCH MORTAR AND PROJECTILE

and the projectile weighs 9 pounds. For the gun mounted on a motor car the caliber is 3-inch and the projectile weighs 12 pounds, leaving the muzzle with a velocity of 2,060 feet per second. The range is about 6 miles and the height attained is nearly 4 miles.

The trench mortars were valuable chiefly for the work at short distances when the opposing armies faced each other over No Man's Land. Because of their mobility, they were useful in accompanying the drives that both sides at times inaugurated, because they could be set up rapidly in newly acquired positions. Great quantities of them were used in connection with the German drive of March, 1918.

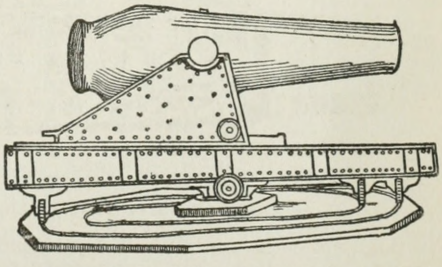
MACHINE GUNS (*q. v.*) have claims to be classed as artillery, although mostly they were used as the personal weapons of the individuals that handled them. They had never before been used in such almost incalculable numbers.

In its broadest sense, "Artillery" includes all those forms of weapons and their appurtenances that are designed for projecting missiles at an enemy. Technically speaking, however, as has been already stated, it applies only to guns from which projectiles are thrown by the explosive force of gunpowder. In this narrow sense, its history naturally begins with the invention of gunpowder.

Guns.—Essentially a gun is a tube, closed at one end, into which are loaded a charge of gunpowder and a projectile, with some arrangement for igniting the powder. As the powder burns, it is converted into gas and exerts a pressure which drives the projectile down the bore and projects it at high velocity from the muzzle.

Guns are commonly designated by their caliber; as "3-inch," "12-inch," etc., the "caliber" being the diameter of the bore and of the projectile. Excluding shoulder pieces and machine guns, which are not within the scope of this article, guns of the present day range from 3 to 16 inches in caliber; the 16-inch, the most powerful gun in existence in 1921, having been designed especially for the armament of the United States battleships of the 1920 class.

The guns in use up to the middle of the last century were of cast iron or



THE RODMAN 10″ GUN, USED IN THE AMERICAN CIVIL WAR

bronze, cast in a single homogeneous mass around a core. They were "smooth-bored" and "muzzle-loading" and fired

a spherical shot or shell weighing perhaps 10 per cent. of the weight of the elongated projectile of a modern gun of the same caliber. About 1850, General T. J. Rodman, of the United States Army, conceived the idea of increasing the strength of guns by casting them with a hollow core through which a stream of cold water was kept flowing. The effect of this was to produce a varying tension in the successive layers of metal from the inside out, so that the walls of the gun acted as a whole in resisting the pressure of the powder when the gun was fired. This principle, of "varying initial tensions," is applied in modern guns by building up the walls in successive layers of steel hoops, shrunk, one upon another, over a central tube. *Figure 1, Plate A.* The tube is pierced throughout its length to form the bore, which is rifled by grooves running spirally from breech to muzzle. The projectile, which is cylindrical with a pointed head, carries at its base a ring of soft copper, which, when the gun is fired, is forced into the grooves of the rifling and sets the projectile spinning with great velocity as it is driven along the bore. It is this spinning that keeps the projectile true in flight and makes possible the long ranges and great accuracy attained by modern artillery. The gun is fired by a primer through a vent in the breech plug.

The practical development of the rifled gun of large caliber as an actual and important factor in warfare dates from about 1855, although the principle involved had long been familiar to artillerists and had been applied experimentally as early as 1745. Built-up guns came into use at about the same time (1850-1860), and the combination of these two factors resulted in the development of the high-powered, built-up, rifled gun, which, in the last half of the 19th century, practically revolutionized artillery, especially naval artillery, and, in association with smokeless powder—perfected about the end of the century—may be held to have practically revolutionized warfare.

The first built-up guns were of wrought iron, but this was soon replaced by steel, the manufacture of which was greatly improved through the demands of artillerists for a combination of elastic and tensile strength never before considered possible. The leader in the manufacture of the new guns on a commercial scale was the English metallurgist Sir William Armstrong.

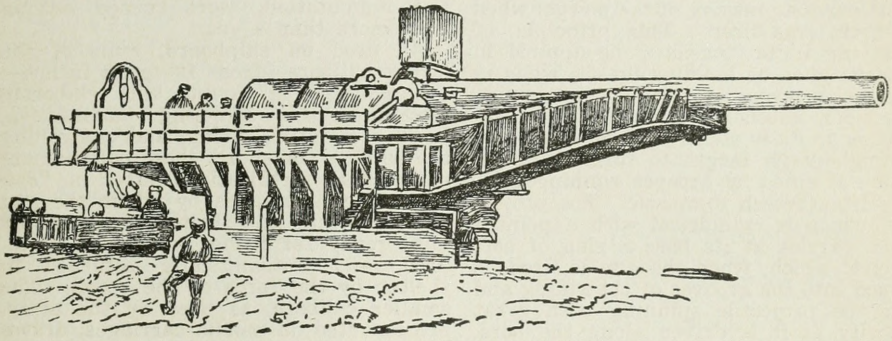
In Germany, Krupp used steel at an early date, but was behind Armstrong in adopting the built-up system. The first modern gun in the United States was built about 1880, but the manufacture on a large scale was not undertaken until several years later, when the great steel plant at Bethlehem was established through the influence, and to meet the demands, of the navy. By 1917, when the United States entered the World War, the manufacture of ordnance by Bethlehem and other establishments and especially by the Naval Gun Factory at Washington, had so far progressed that more than three thousand guns of all calibers, with their mounts and ammunition, were turned out in little more than a year.

As used on shipboard, guns of the larger calibers—from 10 to 16 inches—are mounted in turrets with elaborate mechanism for handling ammunition, loading, pointing, firing, and controlling the recoil. On shore, these calibers are mounted in fortifications, often on "disappearing" carriages by which the gun is held behind the shelter of a parapet until ready for firing, when it is lifted, fired, and automatically returned to shelter by the force of the recoil. The smaller calibers, as used by the army, are mounted on mobile carriages, drawn by men or horses or by automobile tractors, constituting what is technically known as "field" and "siege" artillery.

Projectiles.—In the long struggle between the penetrative power of projectiles and the resisting power of armor, the projectile appears to have established a permanent advantage, at least under proving-ground conditions, which are admittedly unfavorable to armor. The 16-inch guns with which the 1920 class of United States battleships are armed have power enough at fighting ranges to drive their 2,100-pound projectiles through the thickest armor carried by any ship that has up to the present time been proposed.

The Powder Charge.—Modern gunpowder, composed of gun-cotton and nitroglycerine, is as different from the powder of fifty years ago as modern guns are from the guns of the same period. Although commonly called "smokeless," it is far from being so, but it produces decidedly less smoke than the old "black" powder, and its force is many times as great. Its essential feature, apart from its force, lies in its "progressiveness," by which is meant that, instead of burning all at once, with a violent explosion, it burns slowly and gives off its gases gradually, thus giving the projectile a *push* rather than a *blow*—but a push that becomes more and more pronounced as the projectile moves toward the muzzle. In this way it gives a higher velocity to the projectile with much less strain on the gun.

Gun Mounts.—The problem of mounting a high-powered gun of large caliber in such a way as to admit of manipulating it freely and controlling the tremendous shock of the recoil is a difficult and complicated one. *Figure 2, Plate A*, shows three 14-inch guns of the U. S. S. Idaho on a single mount as installed in each of the turrets of the ship. The photograph shows the three guns firing simultaneously. The power developed by a salvo of this kind would suffice to lift a city skyscraper some four feet off its foundation. *Plate B* shows one of these guns photographed in a way to illustrate its length, which is a little more than 70 feet. The length of the 16-inch gun previously referred to is about 10 feet greater.



THE GERMAN LONG-DISTANCE GUN THAT SHELLED PARIS FROM A POINT 75 MILES AWAY

Plate C shows a 14-inch gun on a specially designed railway mount as used at the French front, together with its powder charge and projectile. Five of these guns were used in the last months of the World War and with great effect. They were the most powerful guns used on either side during the war, either ashore or afloat; and they were designed and built, with their mounts, at the Naval Gun Factory at Washington, and were transported to the front and operated there by officers and men of the United States Navy. The freak gun used by the Germans in their long-range bombardment of Paris had a greater range than these guns, but its projectile weighed only 200 pounds as against 1,400 for the American gun, and the damage to be anticipated from an explosion of its projectile was not more than 5 per cent. as great.

ARTILLERY SCHOOLS, institutions established for the purpose of giving a special training to the officers, and, in some cases, the men, belonging to the artillery service. In Great Britain the artillery schools are at Woolwich and Shoeburyness. An artillery school at Fort Monroe, Va., first established in 1823, discontinued, re-established in 1867, discontinued again in 1898, and again reopened in 1900, gives instruction, both theoretical and practical. The artillery regiments of the regular army have each one foot-battery at the school; term of instruction, one year. A school of five for field artillery was opened at Fort Sill in 1911. All of the other important artillery powers have artillery schools, France at Fontainebleau, England at Woolwich, Italy at Natturno, etc.

ARTOCARPACEÆ, a natural order of plants, the bread-fruit order, by some botanists ranked as a sub-order of the *urticaceæ*, or nettles. They are trees or shrubs, with a milky juice, which in some species hardens into caoutchouc, and in the cow tree (*brosimum galactodendron*) is a milk as good as that obtained from a cow. Many of the plants produce an edible fruit, of which the best known is the bread-fruit (*artocarpus*).

ARTOIS, a former province of France, anciently one of the 17 provinces of the Netherlands, now almost completely included in the department of Pas de Calais.

ARUM, a genus of plants belonging to the order *araceæ*, or arads. It contains the well known *A. maculatum*, the cuckoo-print (meaning point), lords and ladies, or wake robin. The solitary spikes of bright scarlet berries may often be seen under hedges in winter, after the leaves and spadix have disappeared. They are poisonous. The rhizomes are used in Switzerland for soap. There is in them an amylaceous substance, which after the acrid matter has been pressed out, may be employed in lieu of bread flour.

ARUNDEL, THOMAS, third son of Richard Fitz-Alan, Earl of Arundel, born in 1352, died in 1413. He was

Chancellor of England and Archbishop of Canterbury. He concerted with Bolingbroke to deliver the nation from the oppression of Richard II., and was a bitter persecutor of the Lollards and followers of Wyclif.

ARUNDELIAN MARBLES, a series of ancient sculptured marbles discovered by William Petty, who explored the ruins of Greece at the expense of and for Thomas Howard, Earl of Arundel, who lived in the time of James I. and Charles I. After the Restoration they were presented by the grandson of the collector to the University of Oxford. Among them is the "Parian Chronicle," a chronological account of the principal events in Grecian, and particularly in Athenian, history, during a period of 1318 years, from the reign of Cecrops (1450 B. C.) to the archonship of Diognetus (264 B. C.).

ARUNDEL SOCIETY, a society instituted in London in 1848 for promoting the knowledge of art by the publication of fac-similes and photographs. It was discontinued in 1897, but revived in 1904 under the name of Arundel Club.

ARUNDO, a Linnæan genus of grasses. One species (*A. donax*) supplies material for fishing-rods, and is imported for the purpose from the S. of Europe, where it is indigenous. The striped-leaved variety, formerly more common than it now is in gardens, is called gardener's garters.

ARUSPICES (a-rus'pe-sez), or **HARUSPICES**, a class of priests in ancient Rome, of Etrurian origin, whose business was to inspect the entrails of victims killed in sacrifice, and by them to foretell future events.

ARUWIMI (ar-ö'ē-mē), a large river of equatorial Africa, a tributary of the Kongo, which it enters from the N.

ARVAL BROTHERS (*fratres arvales*), a college or company of 12 members elected for life from the highest ranks in ancient Rome, so called from offering annually public sacrifices for the fertility of the fields.

ARYAN, in general language, pertaining to the old race speaking the primeval Aryan tongue, or any of the numerous forms of speech which have sprung from it. The ancestors of most modern Europeans lived together as one people, speaking the primeval Aryan tongue, in central Asia, and apparently near the Pamir steppe.

In a special sense, the Aryan race which invaded India at a period of remote antiquity, possibly 1700 B. C., and still remains the dominant Hindu race there.

ARYAN LANGUAGES, a great family of languages, sometimes, though rarely, and not quite accurately, called Japhetic; more frequently designated as the Indo-European or Indo-Germanic family of tongues. They have reached a higher development than those of the second great family, the Semitic, the better described as the Syro-Arabian family, and are far in advance of the next one—that comprising the Turanian tongues. Like the Syro-Arabian forms of speech, they are inflectional; while those of Turanian origin are only agglutinate. Max Müller separates the Aryan family of languages primarily into a southern and a northern division. The former is subdivided into two classes: (1) The Indic and (2) the Iranic; and the latter into six: (1) the Celtic; (2) the Italic; (3) the Illyric; (4) the Hellenic; (5) the Windic; and (6) the Teutonic. It is often said that Sanskrit, spoken by the old Brahmins, is the root of all these classes of tongues. As an illustration of the affinity among the Aryan tongues, take the common word daughter. It is in Swedish, *dotter;* Danish, *datter;* Dutch, *dochter;* German, *tochter;* Old Hebrew German, *tohtar;* Gothic, *dauhtar;* Lithuanian, *duktere;* Greek, *thygater;* Armenian, *dustr;* Sanskrit, *duhitri;* the last-named word signifying, primarily, "milkmaid," that being the function, in the early Brahman or Aryan household, which the daughter discharged.

ARYAN RACE, a designation, since about 1845, of the ethnological division of mankind otherwise called Indo-European or Indo-Germanic. That division consists of two branches geographically separated, an eastern and western. The western branch comprehends the inhabitants of Europe, with the exception of the Turks, the Magyars of Hungary, the Basques of the Pyrenees, and the Finns of Lapland; the eastern comprehends the inhabitants of Armenia, of Persia, of Afghanistan, and of northern Hindustan. The evidence on which a family relation has been established among these nations is that of language, and from a multitude of details it has been proven that the original mother tongue of all these peoples was the same. It is supposed that the Aryan nations were at first located somewhere in central Asia, probably E. of the Caspian, and N. of the Hindu Kush and Paropamisan Mountains. From this center successive migrations took place to-

ward the N. W. The first swarm formed the Celts, who at one time occupied a great part of Europe; at a considerably later epoch came the ancestors of the Italians, the Greeks, and the Teutonic people. The stream that formed the Slavonic nations is thought to have taken the route by the N. of the Caspian. At a later period the remnant of the primitive stock would seem to have broken up. Part passed southward and became the dominant race in the valley of the Ganges, while the rest settled in Persia and became the Medes and Persians of history. It is from these eastern members that the whole family takes its name. In the most ancient Sanskrit writings (the Veda), the Hindus style themselves Aryas, the word signifying "excellent," "honorable," originally "lord of the soil."

AS, among the Romans, a weight, coin, or measure. (1) As a weight of 12 ounces, the same as a *libra* or pound, and divided into 12 parts called *unciæ* or ounces. (2) As a coin, which, in the time of Tullus Hostilius, is said to have weighed 12 ounces. After the first Punic War had exhausted the treasury, it was reduced to two ounces. The second Punic War brought it to one ounce; and, finally, the Papirian law fixed it at half an ounce only. At first it was stamped with a sheep, an ox, a ram, or a sow, but under the empire it had on one side a two-faced Janus, and on the other the rostrum or prow of a ship.

ASA, son of Abijah, and third King of Judah, conspicuous for his earnestness in supporting the worship of God and rooting out idolatry, and for the vigor and wisdom of his government. He reigned from 955 to 914 B. C.

ASABA (as-a-bä'), a town of southern Nigeria in west Africa, on the Niger river, 150 miles from the coast and 75 miles above the delta. It is a place of considerable commercial importance and the seat of the Supreme Court.

ASAFETIDA, ASAFŒTIDA, or **ASSAFŒTIDA**, the English name of two if not more, plants growing in Persia and the East Indies, the *ferula asafœtida* and the *F. persica*. They belong to the order *apiaceæ*, or umbellifers. The word is also applied to the drug made from them. Old plants being cut across, juice exudes from the wound. This being scraped off, is exposed to the sun to harden it, and is sent in large irregular masses to this country for sale. It is a useful medicine in hysteria, asthma, tympanites, dyspnœa, pertussus, and worms; it is sometimes given also as a clyster.

ASAMA, an active volcano of Japan, about 50 miles N. W. of Tokio, 8,260 feet high.

ASAPH, a Levite and psalmist appointed by David as leading chorister in the divine services. His office became hereditary in his family, or he founded a school of poets and musicians, which were called after him, "the sons of Asaph."

ASARABACCA, a small, hardy European plant, natural order *aristolochiaceæ* (*asarum europæum*). Its leaves are acrid, bitter, and nauseous, and its root is extremely acrid. Both the leaves and root were formerly used as an emetic. The species *A. canadense*, the Canada snake-root, is found in the Western States.

ASBESTOS, a variety of hornblende, Asbestos is exceedingly infusible, at least in a mass. It contains a considerable percentage of magnesia in its composition. It occurs mostly in serpentine districts. The varieties are: (a) Amianthus, in which the fibers are so exceedingly long, flexible, and elastic, that they may be woven into cloth. (b) Common asbestos, with the fibers much less flexible. It is heavier than the first variety. It is dull green, sometimes pearly in luster, and unctuous to the touch. (c) Mountain cork, light enough to float on water. (d) Mountain leather, also very light, but thinner and more flexible than the last. (e) Mountain paper, a designation formerly given to fine, thin specimens of mountain leather. (f) Mountain wood, which, in the external aspect, resembles dry wood. In the United States it is found principally in California and Georgia. Manufacturers draw their chief supply from Canada.

ASBURY, FRANCIS, the first Methodist bishop consecrated in America, born at Handsworth, Staffordshire, Aug. 20, 1745. When 16 years old he became an itinerant Wesleyan preacher, and in 1771 he was sent as a missionary to America, where he was consecrated in 1784. During a long life of almost incessant labor it is estimated by his biographer that he traveled about 270,000 miles (mostly on horseback), preached about 16,500 sermons, and ordained more than 4,000 preachers. Of great natural ability and indomitable energy, he ranks with Wesley, Whitefield, and Coke in the Methodist movement of his time. He died in Richmond, Va., March 31, 1816.

ASBURY PARK, a city and popular summer resort in Monmouth co., N. J.; on the Atlantic Ocean, 6 miles S. of Long Branch, and on several railroads. It adjoins Ocean Grove on the N., being separated from it by Wesley Lake. It was founded in 1869, and given a city charter in 1897. The city contains a large number of hotels and boarding-houses, many attractive summer dwellings, electric lights and street railways, National banks, and several periodicals. It has trolley connections with a cluster of summer resorts extending down to Atlantic Highlands, and is rapidly becoming nearly as popular a winter as a summer resort. Asbury Park and Ocean Grove were originally laid out by members of the Methodist Episcopal Church for camp meetings and other purposes. Pop. (1910) 10,150; (1920), 12,400.

ASCALON (as'kal-on), **ASHKELON**, or **ASKELON**, one of the five cities of the Philistines, on the Mediterranean, W. S. W. of Jerusalem, on the main road from Egypt through Gaza to central Palestine. Very often mentioned in Scripture, it rose to considerable importance in past Biblical times. Near the town were the temple and sacred lake of Derceto, the Syrian Venus. A great victory was won here by the crusaders in 1099. The position of Ascalon is naturally very strong. Near the ruins of the city stands now a village of the same name. The eschalot or shallot, a kind of onion (*allium escalonicum*), was first grown there.

ASCANIUS (as-kā'nē-us), a son of Æneas and Creusa, who accompanied his father in his flight from the burning of Troy, and landed in Italy. He ably supported Æneas in his war with the Latins, and succeeded him in the government of Latium. He afterward built Alba Longa, to which he transferred his seat of government from Lavinium, and reigned there 38 years. His descendants ruled over Alba for 420 years.

ASCARIS, a genus of intestinal worms, the typical one of the family *ascaridæ*. *A. lumbricoides*, or round worm, is the commonest intestinal parasite of the human species, generally occupying the small intestines; it is found also in the hog and ox. In the human species it is much more common in children than in adults, and is extremely rare in aged persons. A second species, the *ascaris* or *oxyurus vermicularis*, is one of the most troublesome parasites of children, and occasionally of adults. It infests the larger intestines.

ASCENSION (discovered on Ascension Day), an island of volcanic origin belonging to Great Britain, near the middle of the South Atlantic Ocean, lying about lat. 7° 55′ S., long. 15° 25′ W.; 800 miles N. W. of St. Helena; area, about 36 square miles; pop. 165. It is retained by Great Britain mainly as a station at which ships may touch for stores. It is celebrated for its turtles, which are the finest in the world. Wild goats are plentiful, and oxen, sheep, pheasants, guinea-fowl, and rabbits have been introduced, and thrive well. Georgetown is the principal settlement. The island is governed by a naval officer.

ASCENSION, in astronomy, right ascension is the distance of a heavenly body from the first point of Aries (the ram), measured upon the equator. The arc of the equinoctial included between a certain point in that circle, called the vernal equinox, and the point in the same circle to which it is referred by the circle of declination passing through it. Or the angle included between two hour-circles, one of which, called the equinoctial colure, passes through the vernal equinox, and the other through the body. It is opposed to oblique ascension. The terms, right ascension and declination, are now generally used to point out the position in the heavens of any celestial object, in preference to the old method of indicating certain prominent stars by proper names or by Greek letters. By means of the transit instrument, or by an equatorially mounted telescope, a star or planet may be readily found, when once its right ascension and declination are known. Oblique ascension is the arc of the equator intercepted between the first point of Aries and the point of the equator which rises with a star or other heavenly body, reckoned according to the order of the signs.

ASCENSION DAY, the day on which our Saviour's ascension, is commemorated—the Thursday but one before Whitsuntide, sometimes called Holy Thursday.

ASCETICS, a name given in ancient times to those Christians who devoted themselves to severe exercises of piety and strove to distinguish themselves from the world by abstinence from sensual enjoyments and by voluntary penances. They, therefore, abstained from wine, flesh, matrimony, and worldly business; and, moreover, emaciated their bodies by long vigils, fasting, toil, and hunger. Both men and women embraced this austere mode of life.

ASCHAM, ROGER, an English scholar and author, born at Kirby Wiske, near Northallerton, in 1515; graduated at Cambridge, and struggled with poverty until patrons came to his relief. He was famous for his general knowledge and acquirements in Greek and Latin, and is classed with Spenser, Sir Thomas More, and Sir Philip Sidney. Though he wrote Latin with ease and elegance at a time when custom favored the use of that language for important works, he urged and practiced the writing of English. In 1548-1550 he was tutor of the Princess (afterward Queen) Elizabeth. His most noted works are: "Toxophilus," a treatise on archery (1545), and "The Scholemaster," a treatise on education (1570). He died in London, Dec. 30, 1568.

ASCIAN, plural **ASCIANS**, in the plural, those who at midday of one or two days of the year are destitute of a shadow. Those living in the Tropics of Cancer and Capricorn are so at midday once a year, and those living between those circles are so twice a year.

ASCIDIA, or **ASCIDIÆ**, the first order of the tunicated class of mollusca. It contains four families, the *ascidiadæ*, or simple ascidians; the *clavellinidæ*, or social ascidians; the *botryllidæ*, or compound ascidians; and the *pyrosomatidæ*, an aberrant family tending to the order *biphora*.

ASCIDIADÆ, simple ascidians; the typical family of the ascidian order of tunicated mollusca. The animals are simple and fixed; they are solitary and gregarious, with their branchial sac simple or disposed in 8—18 deep and regular folds. Their external integument is provided with two apertures, making them look like double-necked jars. When touched they squirt a stream of water to some distance. They look like shapeless cartilaginous masses. Some are highly colored. In Brazil, China, and the Mediterranean they are eaten as food.

ASCITES, an effusion of fluid of any kind into the abdomen; especially effusion of fluid within the cavity of the peritoneum, as distinguished from ovarian dropsy and dropsy of the uterus. There is an idiopathic ascites, which may be of a chronic or acute form, or of an asthenic type; and a sympathetic or consequential ascites. Another division is into active ascites, that in which there is a large effusion of serum into the cavity of the peritoneum, after undue exposure to cold and wet; and passive ascites, that produced by disease of the heart or liver.

ASCLEPIADACEÆ (as-klep-ē-a-das'-ē-i), an order of plants closely allied to the *apocynaceæ*, or dogbanes. Shrubs, or more rarely herbs, almost always milky, and frequently twining. Leaves entire, opposite; flowers umbellate, fascicled, or racemose. Their favorite habitat is Africa. They occur also in India and the tropics generally. Fully 1,000 are known. The milk, which in some species furnishes caoutchouc, is usually acrid and bitter, though apparently not so deleterious as that of *apocynaceæ*. That of *calotropis gigantea*, the akund, yercum, or mudar plant of India, has been used with effect in leprosy, elephantiasis, and some other diseases. The roots of *cynanchum tomentosum*, and *periploca emetica* are emetic. *Gymnema lactiferum* is the cow-plant of Ceylon. *Pergularia edulis* and *periploca esculenta* are eatable. *Diplopepis vomitoria* is expectorant and diaphoretic, and is used like ipecacuanha in dysentery. *Hemidesmus indica* is the Indian sarsaparilla. The leaves of *cymanchum argel* are used in Egypt for adulterating senna. *Mardenia tenacissima* is employed for bowstrings by the mountaineers of Rajmahal, while *M. tinctoria* and *gymnema tingens* yield an indigo of excellent quality.

ASCLEPIAS, a genus of plants, the typical one of the order *asclepiadaceæ*. The species are found chiefly along the eastern portion of North America, in Bermuda, etc. Though all more or less poisonous, they are used medicinally. *A. decumbens*, excites general perspiration without in any perceptible degree increasing the heat of the body. It is used in Virginia as a remedy against pleurisy. Another variety, *A. tuberosa*, is a mild cathartic and diaphoretic. The root and tender stalks of *A. volubilis* create sickness and expectoration. *A. tuberosa* (butterfly weed) and *A. curassavica*, sometimes but incorrectly called ipecacuanha, are also medicinal plants, while *A. lactifera* yields a sweet, copious milk used by the Indians, etc.; hence the ordinary name milkweed. *A. aphylla* and *stipitacea* are eatable.

ASCOLI PICENO, (as'kō-lē pē-chā'nō), frontier town of central Italy, in the Marches, 73 miles S. of Ancona. It is a handsome place, well built and strongly fortified. Ascoli is the ancient Asculum Picenum, described by Strabo as a place of almost inaccessible strength. It sustained a memorable siege against the Romans under Pompey. Ascoli manufactures majolica ware, glass, wax, silks, leather, hats, and cloth, and is commercially very active. Pop. about 30,000.

ASCOLIO SATRIANO (sat-rē-ä′nō) a very ancient town of south Italy, in the province of Foggia, 13 miles S. E. of Bovino. It was here that Pyrrhus encountered for a second time the Roman legion, but with no decisive result to either side. It was destroyed by an earthquake in 1400. Pop. about 10,000.

ASCOMYCETES. See **FUNGUS.**

ASCOT HEATH, a race-course in Berkshire, England, 29 miles W. S. W. of London, and 6 miles S. W. of Windsor. It is circular, only 66 yards short of 2 miles in length; the races take place early in June and include the famous Ascot Gold Cup, instituted in 1771. The course was laid out in 1711 by order of Queen Anne.

ASDOOD, or **ASDOUD**, a small seaport of Palestine, on the Mediterranean, 35 miles W. of Jerusalem. It was the Ashdod of Scripture, one of the five confederate cities of the Philistines, and one of the seats of the worship of Dagon. It occupied a commanding position on the high road from Palestine to Egypt, and was never subdued by the Israelites. It sustained against Psammetichus a siege of 29 years B. C. 630; was destroyed by the Maccabees, and restored by the Romans, B. C. 55. It is now an insignificant village called Esdud, from which the sea is constantly receding.

ASGARD, the Heaven of Scandinavian mythology.

ASH, a genus of deciduous trees belonging to the natural order *oleaceæ*, having imperfect flowers and a seed vessel prolonged into a thin wing at the apex (called a samara). There are a good many species, chiefly indigenous to Europe and North America. The common ash (*F. excelsior*), indigenous to Great Britain, has a smooth bark, and grows tall and rather slender. The flowers are produced in loose spikes from the sides of the branches, and are succeeded by flat seeds which ripen in autumn. It is one of the most useful of British trees on account of the excellence of its hard, tough wood and the rapidity of its growth. There are many varieties of it, as the weeping ash, the curled-leaved ash, the entire-leaved ash, etc. The flowering or manna ash (*F. ornus*), by some placed in a distinct genus (*ornus*), is a native of the S. of Europe and Palestine. It yields the substance called manna, which is obtained by making incisions in the bark, when the juice exudes and hardens. Among American species are the white ash (*F. americana*), with lighter bark and leaves; the red or black ash (*F. pubescens*), with a brown bark; the black ash, (*F. sambucifolia*), the blue ash, the green ash, etc. They are all valuable trees. The mountain ash, or rowan, belongs to a different order.

ASH, or **ASHES**, the incombustible residue of organic bodies (animal or vegetable) remaining after combustion. As a commercial term, the word generally means the ashes of vegetable substances, from which are extracted the alkaline matters called potash, pearlash, kelp, barilla, etc.

ASHANTI, or **ASHANTEE**, formerly a kingdom, now a British protectorate, in west Africa, on the Gold Coast, and to the N. of the river Prah; area about 20,000 square miles. It is in great part hilly, well watered, and covered with dense tropical vegetation. The country round the towns, however, is carefully cultivated. The crops are chiefly rice, maize, millet, sugar-cane, and yams, the last forming the staple vegetable food of the natives. The domestic animals are cows, horses of small size, goats, and a species of hairy sheep. The larger wild animals are the elephant, rhinoceros, giraffe, buffalo, lion, hippopotamus, etc. Birds of all kinds are numerous, and crocodiles and other reptiles abound. Gold is abundant, being found either in the form of dust or in nuggets. The Ashantis used to be warlike and ferocious, with a love of shedding human blood amounting to a passion, human sacrifices being common. Polygamy is practiced by them. They make excellent cotton cloths, articles in gold, and good earthenware, tan leather and make sword blades of superior workmanship. The chief town is Kumasi, which is connected with Sekondi on the coast by a railway 168 miles long. (Pop. about 25,000). The British first came in contact with the Ashantis in 1807, and hostilities continued off and on till 1826, when they were driven from the seacoast. Immediately after the transfer of the Dutch settlements on the Gold Coast to Great Britain in 1872—when the entire coast remained in British hands—the Ashantis reclaimed the sovereignty of the tribes round the settlement of Elmina. This brought on a sanguinary war, leading to a British expedition in 1874, in which Kumasi was captured, and British supremacy established along the Gold Coast. In 1895-1896 another British expedition, from the Gold Coast, took possession of Kumasi, forced the submission of the King, who, with his prin-

cipal chiefs, was sent to Sierra Leone, and established a protectorate over the country. In 1900 a sudden uprising of native tribes was put down only after considerable fighting. Great Britain definitely annexed Ashanti, Sept. 26, 1901, and it now forms part of the Gold Coast Colony. Pop. about 300,000.

ASHBURTON TREATY, a treaty concluded at Washington in 1842, by Alexander Baring, Lord Ashburton, and the President of the United States; it defined the boundaries between the State of Maine and Canada.

ASHBY-DE-LA-ZOUCH (-zōsh), a town of Leicestershire, England, near the source of the Mease, a tributary of the Trent, 18 miles N. W. of Leicester. It owes its suffix to the Norman family of La Zouch. Their ruined castle, celebrated in Scott's "Ivanhoe," crowns a height to the S. of the town. Mary Queen of Scots was imprisoned here. Leather is the staple industry. Pop. about 5,000.

ASHERA (ash-ē'ra), an ancient Semitic goddess, whose symbol was the phallus. In the Revised Version of the Old Testament this word is used to translate what in the ordinary version is translated "grove," as connected with the idolatrous practice into which the Jews were prone to fall.

ASHEVILLE, city and county-seat of Buncombe co., N. C., on the Southern railroad, near the French Broad river; 275 miles W. of Raleigh. It is in a tobacco-growing region; has manufactories of cotton goods, shoes, ice, tobacco, and flour; and is widely noted as a winter and summer resort, especially for invalids from the Northern States. The city is more than 2,000 feet above the level of the sea; is surrounded by impressive mountain scenery; and has the Bingham Military Academy, Normal College and Collegiate Institute for Young Women, Home Industrial School for Girls, Asheville Farm School for Boys, Industrial School for Colored Youth, banks, electric lights, and many hotels and boarding-houses. Adjoining it is the estate of Biltmore, established by George Vanderbilt, of New York City; one of the finest botanical gardens in the world; Pisgah forest, a hunting preserve of 84,000 acres; Battery and Riverside Parks; and Mount Beaumont, 2,800 feet high. Pop. (1910) 18,762; (1920) 28,504.

ASHLAND, a city of Kentucky, in Boyd co., about 146 miles S. E. of Cincinnati. It is on the Chesapeake and Ohio, and the Norfolk and Western railroads, and on the Ohio and Big Sandy rivers. An important industrial city, it has manufactures of pig iron, wire nails, steel products, leather, cement, furniture, etc. The city is notable for a handsome park in its center. Pop. (1910) 8,688; (1920) 14,729.

ASHLAND, town and county-seat of Ashland co., O.; on the Erie and other railroads; about 50 miles S. W. of Cleveland. It has important manufactures, large trade, a National bank, and several newspapers. Pop. (1910) 6,795; (1920) 9,249.

ASHLAND, a borough in Schuylkill co., Pa.; in the valley of the Mahanoy, and on several railroads; 12 miles N. W. of Pottsville. It is in the center of the great anthracite coal fields; has extensive mining industries, large machine shops, foundries, and factories; and contains the State Miners' Hospital, a National bank, public hall, and several churches. Pop. (1910) 6,855; (1920) 6,666.

ASHLAND, city and county-seat of Ashland co., Wis.; on Chequamegon Bay, Lake Superior and several railroads; 80 miles E. of Duluth, Minn. It has one of the finest harbors on the lake, and besides its general lake traffic, it is a shipping port for the hematite ore of the great Gogebic Iron Range. To accommodate its iron interests, it has a number of enormous ore docks. Other special interests are lumber and brown stone. It has very large charcoal blast furnaces, used for the manufacture of pig iron. Near by is the group of Apostles' Islands. The institutions include Northland College, the North Wisconsin Academy, hospitals, etc. Pop. (1910) 11,594; (1920) 11,334.

ASHLEY, a borough of Pennsylvania in Luzerne co., on the Central of New Jersey and the Wilkes-Barre and Hazleton railroads. It practically forms a part of Wilkes-Barre, being only one mile distant from that city. It has coal mines and railroad shops. Pop. (1910) 5,601; (1920) 6,520.

ASHLEY, WILLIAM JAMES, an Anglo-American educator, born in London, England, in 1860; was educated at Oxford; became lecturer in history in Corpus Christi College. In 1888 he was appointed Professor of Political Economy and Constitutional History in the University of Toronto, and, in 1892, was called to the newly created chair of Economic History in Harvard University. In 1901 he returned to England, becoming professor of commerce and finance,

and later dean of the faculty of commerce in the University of Birmingham. He has published numerous books on economic subjects.

ASHOKAN RESERVOIR. See AQUEDUCT.

ASHRAF, a town in the Persian province of Mazanderan, near the S. coast of the Caspian Sea, 56 miles W. of Astrabad. It was a favorite residence of Shah Abbas the Great, and was adorned by him with splendid buildings, of which only a few miserable ruins now remain. It still contains over 800 houses, and has some trade in the cotton and silk produced in its vicinity.

ASHTABULA, a city in Ashtabula co., O., on Lake Erie, and several important railroads; 55 miles N. E. of Cleveland. It is in an agricultural and dairy region, and has an excellent harbor where the river of the same name enters the lake. The city is noteworthy for the facts that it receives the largest amount of iron ore of any port in the United States, and the amount of its shipment of the same is surpassed by few on the Great Lakes. Its extensive railroad and lake communications give it a special importance in the industrial world, as it stands between the great coal and iron mining regions and the extensive manufacturing districts of Pennsylvania. There are numerous industrial establishments and a large dry dock and ship-building plant. Pop. (1910) 18,266; (1920) 22,082.

ASHTORETH (ash'tō-ret), **ASTAROTH** or **ASTARTE**, a goddess worshipped by the Jews in times when idolatry prevailed; the principal female divinity of the Phœnicians, as Baal was the principal male divinity. Ashtoreth is the Astarte of the Greeks and Romans, and is identified by ancient writers with the goddess Venus (Aphrodite). She is probably the same as the Isis of the Egyptians, and closely connected with the Asherah of Scripture; Ashtoreth being, according to Berthau, the name of the goddess, and Asherah the name of her image or symbol. In Scripture, she is almost always joined with Baal, and is called god, Scripture having no particular word for expressing goddess. She was the goddess of the moon; her temples generally accompanied those of the sun; while bloody sacrifices or human victims were offered to Baal, bread, liquors, and perfumes were presented to Astarte.

ASHURST, HENRY FOUNTAIN, United States Senator from Arizona. He was born in Winnemucca, Nev., in 1875, was educated in the public schools and took special courses in law and political economy at the University of Michigan. He began the practice of law in Arizona in 1897. In the same year he was a member of the Arizona Legislature and was successfully re-elected, serving as speaker in 1898. He was district attorney of Coconino co., Arizona in 1905-1906 and again in 1907-1908, and was elected United States Senator in 1913 and re-elected in 1917.

ASH WEDNESDAY, the first day of Lent, so called from a custom in the Western Church of sprinkling ashes that day on the heads of penitents, then admitted to penance. The period at which the fast of Ash Wednesday was instituted is uncertain.

ASIA, the largest of the land divisions of the world, occupies the northern portion of the Eastern Hemisphere in the form of a massive continent, which extends beyond the Arctic circle, and by its southern peninsulas nearly reaches the equator. The origin of its name remains unknown. Europe and Asia constitute but one continent, extending from W. to E., and having the shape of an immense triangle, the angles of which are Spain in the W., the peninsula of the Tchuktchis in the N. E., and that of Malacca in the S. E. The Arctic Ocean in the N., the Pacific in the E., and the Indian Ocean, continued by its narrow gulf, the Red Sea, which nearly reaches the Mediterranean, inclose the continent of Asia. The area covered by Asia and its islands is 17,255,890 square miles; that is, almost exactly one-third of the land surface of the globe (32 per cent). Geographically speaking, Europe is a mere appendix to Asia, and no exact geographical delimitation of the two continents is possible.

Peninsulas.—Asia has one mile of coastline for every 337 square miles of its area; that is, three times less than Europe; besides one-fifth of its shores is washed by the ice-bound Arctic Ocean (9,900 miles out of 51,000), or by the foggy and icy Sea of Okhotsk. Its peninsulas comprise nearly one-fifth of its surface. Three immense offsets continue the continent of Asia into more tropical latitudes, Arabia, India, and the Indo-Chinese peninsula, and some likeness exists between them and the three southern peninsulas of Europe, Spain, Italy, and the Balkan peninsula, surrounded by its archipelago of hundreds of islands. Asia Minor protrudes between the Black Sea and the Mediterranean as a huge mass of table-land, broken by narrow gulfs in its western parts. In the Pacific are three large


ASIA
EASTERN PART
SCALE OF STATUTE MILES
0 100 200 300 400 500 600 700
SCALE OF KILOMETERS
0 200 400 600 800 1000
Important towns are shown in heavy face type
Railroads
Canals
Submarine Cables
Longitude 110° East from 120° Greenwich
PACIFIC OCEAN
INDIAN OCEAN
SEA OF JAPAN
EAST CHINA SEA
SOUTH CHINA SEA
PHILIPPINE ISLANDS
CAROLINE ISLANDS
MOLUCCAS
NEW GUINEA
BORNEO
CELEBES
SIBERIA
MONGOLIA
CHINA
TIBET
INDIA
BURMA
SIAM
FRENCH INDO-CHINA
TROPIC OF CANCER
EQUATOR

peninsulas, Korea, Kamchatka, and that of the Tchuktchis. The flat, ever frozen, uninhabitable peninsulas of the Arctic Ocean, Taimyr and Yalmal, could play no part in the growth of civilization.

Seas and Gulfs.—The early inhabitants of Asia had no Mediterranean Sea to serve as a highway of communication between the southern peninsulas. The gulfs which separate them, the Arabian Sea and the Bay of Bengal, are wide open divisions of the Indian Ocean. The Red Sea penetrates between Africa and Arabia; and only now, since it has been brought into communication with the Mediterranean by the Suez Canal, has it become an important channel of traffic. Asia's true Mediterranean is on the E., where several archipelagoes, like so many chains of islands, mark off from the ocean the southern and eastern China Seas, whose Gulfs of Siam and Tonkin, and, especially, the Yellow Sea, with the Gulf of Pechili, penetrate into the continent. The Sea of Japan has on its W. the inhospitable coasts of northern Manchuria. The Sea of Okhotsk and that of Bering, although possessing fine gulfs (Ghizhiga, Anadyr), have no importance for the maritime traffic of nations.

Islands.—The islands of Asia cover an aggregate of no less than 1,023,000 square miles (nearly 6 per cent. of Asia's surface). The coasts of Asia Minor are dotted with islands, of which the Sporades connect it with Greece. Cyprus was from remote antiquity a center of civilization; so also Ceylon. The Laccadives and Maldives are mere coral atolls, rising amid the Indian Ocean and sheltering some 200,000 inhabitants. The islands of east Asia are much more important. A narrow strip of islands, some large, like Sumatra (177,000 square miles) and Java, others mere reefs, extend in a wide semi-circle, under the name of Andaman and Sunda Islands, from Burma to Australia, separating the Indian Ocean from the shallow Java Sea and the Malay Archipelago. This last immense volcanic region, inhabited by the Malay race, comprises the huge Borneo, the ramified Celebes, and the numberless small islands of the Moluccas, the Philippines, etc., connected on the N. W. with the Chinese coast by the island of Formosa. This latter, as well as Hainan, may be properly considered as part of the Chinese mainland. The Loochoo (Liu-Kiu) Islands and the Japanese Archipelago, the latter joining Kamchatka by the Kuriles, continue farther N. E. this chain of islands which border the coast of Asia. In the Arctic Ocean, the small Bear Islands, the archipelago of the Liakhof, Anjou, and De Long Islands, as also those of the Kara Sea, are lost amid icefields, and are but occasionally visited by whalers. Kellett's, or Wrangel's Land, off the peninsula of the Tchuktchis, was thoroughly explored by Lieut. R. M. Berry, United States navy.

Orography.—If the whole mass of the mountains and plateaus of Asia were uniformly spread over its surface, the continent would rise no less than 2,885 feet above the sea, while Africa and North America would respectively reach only 2,165 and 1,950 feet. High plateaus occupy nearly two-fifths of its area. One of them, that of western Asia, including Anatolia, Armenia, and Iran, extends in a southeasterly direction from the Black Sea to the valley of the Indus; while the other, the high plateaus of eastern Asia, still loftier and much more extensive, stretches N. E. from the Himalayas to the northeastern extremity of Asia, resembling in shape a South America pointing N. E., and meeting Bering Strait, the northwestern extremity of the high plateau of North America.

Rivers.—Only four rivers, the Mississippi, Amazon, Kongo, and Nile, surpass the largest rivers of Asia, the Yenisei and the Yangtse-kiang, both as to length and drainage areas; but owing to the scarcity of rain over large parts of Asia, the amount of water carried down by the largest rivers is, as a rule, disproportionately small as compared with American or European rivers. The predominant feature of Asia's hydrography is the existence of very wide areas having no outlet to the sea. On the great plateau of eastern Asia, the region which has no outlet from the plateau, and whose water does not reach even Lake Aral or the Caspian, covers a surface larger than that of Spain, France, and Germany together. It is watered only by the Tarim, which supplies some irrigation works in its upper parts, and enters the rapidly drying marshes of Lob-nor. This area is steadily increasing, and since 1862 we have had to add to it the drainage area (as large as England and Wales) of the Keruleñ, which empties into Dalai-nor, but no longer reaches the Arguñ, a tributary of the Amur. The Ulyasutai River and the Tchagantogoi now no longer reach Lake Balkash; and the Urungu, which obviously joined the Upper Irtysh at no very remote date, empties into a lake separated from the Black Irtysh by a low isthmus not 5 miles wide. If we add to this the drainage basins of

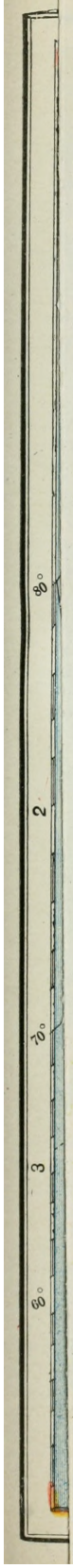
Lake Balkash with its tributaries, the Ili and other smaller rivers; the great Lake Aral, with the Syr-daria (Jaxartes) and Amudaria (Oxus), as also the numerous rivers which flow toward it or its tributaries, but are desiccated by evaporation before reaching them, and finally the Caspian with its tributaries, the Volga, Ural, Kura, and Terek, we find an immense surface of more than 4,000,000 square miles; that is much larger than Europe, which has no outlet to the ocean. The plateaus of Iran and Armenia, two separate areas in Arabia, and one in Asia Minor, represent a surface of 5,567,000 square miles.

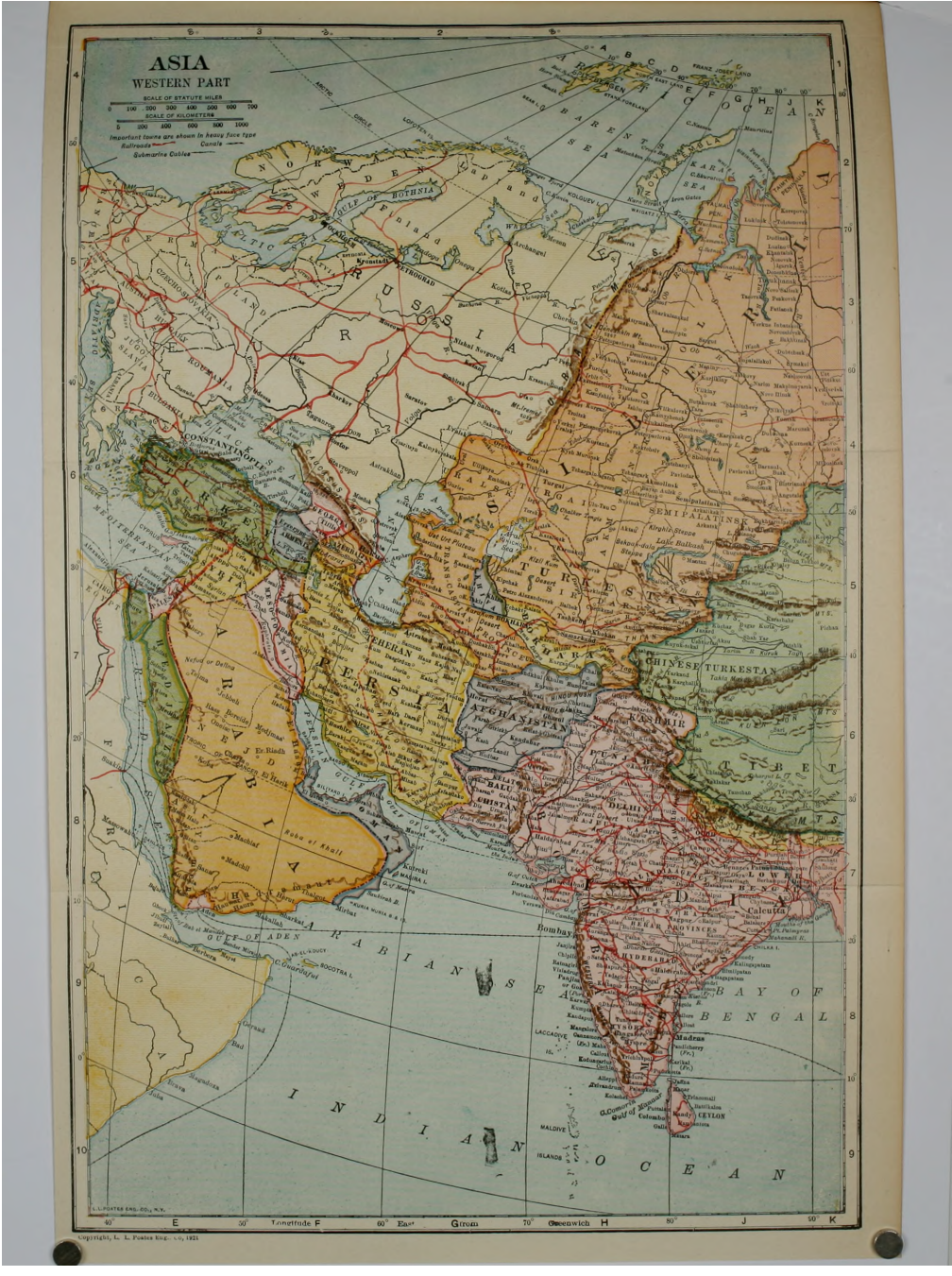
The drainage area of the Arctic Ocean includes all the lowlands of Siberia, its plains and large portions of the great plateau. The chief rivers flowing N. to the Arctic Ocean are the Obi, with the Irtysh; the Yenisei, with its great tributary, the Angara, which brings to it the waters of Lake Baikal, itself fed by the Selenga, the Upper Angara, and hundreds of small streams; and finally the Lena, with its great tributaries, the Vitim, Olekma, Vilui, and Aldan. Three great navigable rivers enter the Pacific: the Amur, composed of the Arguñ and Shilka, and receiving the Sungari, a great artery of navigation in Manchuria, the Usuri and the Zeya; the Hoang-ho; and the Yangtse-kiang, the last two rising on the plateau of Tibet. Freighted boats penetrate from the seacoast to the very heart of China. The Cambodia, or Me-kong, the Salwen, and the Irawadi, rising in the eastern parts of the high plateau, water the Indo-Chinese peninsula. Rising on the same height, the Indus and the Brahmaputra flow through a high valley in opposite directions along the northern base of the Himalayas, until both pierce the gigantic ridge at its opposite ends, and find their way, the former to the lowlands of the Punjab, where it is joined by the Sutlej, and the latter to Assam and Bengal, where it joins the great river of India, the Ganges, before entering the Gulf of Bengal by a great number of branches forming an immense delta. The plateau of the Deccan is watered by the Godavari and Krishna, flowing E., the Narbada, flowing W., and a great number of smaller streams. The Tigris and Euphrates, both rising in the high plateau of Armenia, flow parallel to each other, bringing life to the valley of Mesopotamia, and join before entering the Persian Gulf. Arabia proper has no rivers worthy of notice. The Irmah, which enters the Black Sea, is the only river worthy of notice in Asia Minor. In Caucasus, the Rion and Kuban enter the Black Sea, and the Kura and Terek, the Caspian.

Inland Seas and Lakes.—A succession of great lakes or inland seas are situated all along the northern slope of the high plateaus of western and eastern Asia, their levels becoming higher as we advance farther E. The Caspian, 800 miles long and 270 wide, is an immense sea, even larger than the Black Sea, but its level is now 85 feet below the level of the ocean: Lake Aral, nearly as wide as the Ægean Sea, has its level 157 feet above the ocean; farther E. we have Lake Balkash (780 feet), Zaison (1,200 feet), and Lake Baikal (1,550 feet). Many large lakes appear on the plateau of Tibet (Tengri-nor, Bakha), and on the high plateau of the Selenga and Vitim (Ubsa-nor, Ikhe-aral, Kosogol, Oron); and smaller lakes and ponds are numerous also in the plateau of the Deccan, Armenia, and Asia Minor. Three large lakes, Urmia, Van, and Goktcha, and many smaller ones, lie on the highest part of the Armenian plateau. On the Pacific slope of the great plateau, the great rivers of China and the Amur, with its tributaries, have along their lower courses some large and very many small lakes.

Geology.—The great plateaus, built up of crystalline unstratified rocks, granites, granitites, syenites, and dionites, as well as of gneisses, talc, and mica-schists, clap-slates and limestones, all belong to the Archæan formation (Huronian, Laurentian, Silurian, and partly Devonian), and have been submerged by the sea since the Devonian epoch. The higher terrace of the plateau of Pamir and the plateaus of the Selenga and Vitim are built up only of Huronian and Laurentian azoic schists; and even Silurian deposits, widely spread on the plains, are doubtful on the plateaus. During the Jurassic period, immense fresh water basins covered the surface of those plateaus, and have left their traces in Jurassic coal beds, which are found in the depressions of the plateaus and lowlands. Carboniferous deposits are met with in Turkestan, India, and western Asia; while in eastern Asia the numerous coal-beds of Manchuria, China, and the archipelagoes are all Jurassic.

More than 120 active volcanoes are known in Asia, chiefly in the islands of the S. E., the Philippines, Japan, the Kurile, and Kamchatka, and also in a few islands of the Seas of Bengal and Arabia, and in western Asia. Numerous traces of volcanic eruptions are found in eastern Tian-shan in the northwestern border ridges of the high Siberian plateau, and in the S. W. of Aigun, in


80°
70°
60°
2
3



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Manchuria. Earthquakes are frequent, especially in Armenia, Turkestan, and around Lake Baikal.

Minerals.—There are gold mines of great wealth in the Urals, the Altai, and eastern Siberia; and auriferous sands are found in Korea, Sumatra, Japan, and in the Caucasus Mountains. Silver is extracted in Siberia; platina, in the Urals; copper, in Japan, India, and Siberia; tin, in Banca; mercury, in Japan. Iron ore is found in nearly all the mountainous regions, especially in Asia Minor, Persia, Turkestan, India, China, Japan, and Siberia; but iron mining is still at a rudimentary stage. Immense coal-beds are spread over China and the islands of the Pacific (Hainan, Japanese Archipelago, Sakhalin), eastern Siberia, Turkestan, India, Persia, and Asia Minor. They cover no less than 500,000 square miles in China alone; but the extraction of coal is as yet very limited. Graphite of very high quality is found in the Sayans and northern Siberia. The diamonds of India, the sapphires of Ceylon, the rubies of Burma and Turkestan, the topazes, beryls, etc., of the Urals and Nertchinsk, have a wide repute. Layers of rock-salt are widely spread, and still more so the salt lakes and springs. The petroleum wells of the Caspian shores already rival those of the United States. A variety of mineral springs, some of them equal to the best waters of western Europe, are widely spread over Asia.

Flora.—There is little difference between the vegetation of the E. of Europe and that of northwestern Asia. Forests cover extensive tracts, and consist of pine, fir, larch, cedar, silver fir, birch, aspen, and poplars.

In the region to the E. of the high plateau, including China, Manchuria, and Japan, oak reappears. So also the walnut, the hazel, the lime tree, and the maple; while several new species of poplars, willows, acacias, and many others, make their appearance.

The beech is characteristic of the forests of western Asia. Here also are found all the trees of southern Europe. The vine and several of the European fruit trees (plum, cherry, apricot, pear) are regarded by botanists as belonging originally to this region. The flora of Asia Minor combines those of southern Europe and northern Africa, owing to its evergreen oaks, laurels, olive trees, myrtles, oleanders, and pistachio trees, as also to its variety of bulbous plants.

Southern and southeastern Asia, with their numerous islands, display the richest flora. In the neighborhood of the sea-coasts, the tropical vegetation reaches the variety and size of the American. Here the sugar cane, the cotton shrub, and the indigo had their origin. The cocoanut palm and the banyan tree are the most striking feature of the coast vegetation. Ferns reach the size of large trees. The gigantic banyan, the screw pine, the India rubber, and the red cotton trees occur in immense forests; and bamboos grow thick and high.

In Borneo, Java, and the islands of the archipelago, the tropical vegetation is like that of India. The sago palm, the bread tree, imported from the South Sea Islands, and the tamarind, also imported, are largely cultivated, as also the cocoanut palm and the sugar palm. Orchids appear in their full variety and beauty. The swamps are covered with mangroves or with the nipa or susa palm; and vanilla, pepper, clove, and nearly all the species are native to this region.

Asia has given to Europe a variety of useful plants; among them, wheat, barley, oats, and millet, onions, radishes, peas, beans, spinach, and other vegetables. Nearly all our fruit trees have the same origin; the apple, pear, plum, cherry, almond, pistachio, and mulberry, the raspberry, and even lucerne, were imported from Asia to Europe.

Fauna.—The fauna of nearly the whole of continental Asia belongs to one single domain. Animals could easily spread over the plains of Europe and Siberia on the one side, and on the other along the high plateau which stretches from Tibet to the land of the Tchuktchis. This wide region can be easily subdivided into the Arctic region, the Boreal, embracing the lowlands of western Siberia; the Daurian, in the northern parts of the great plateau; and the central Asian. The fauna of Siberia is much like that of eastern Europe. It is the true habitat of all fur-bearing animals, as the bear, wolf, fox, sable, ermine, otter, beaver, common weasel and squirrel; also the hare, wild boar, the stag, the reindeer, and the elk, all belonging to the European faunus, with the addition of several species common to the Arctic fauna.

The central Asian plateau has a fauna of its own. We find there the wild ancestors of several of our domestic animals, viz., the wild horse, discovered by Przewalski (Prejevalsky) in the Alashan Mountains, the wild camel and donkey, and the *capra ægargus*, from which our common goat is descended. The yak, several species of antelopes, and the roebuck are characteristic of the central Asian fauna; so also are the huge sheep, now disappearing, which

found refuge in the wilder parts of the plateaus. In the Steppe region we find the same fauna as in Siberia, with the addition of the tiger, which occasionally reaches Lake Zaisan, and even Lake Baikal; the leopard and hyena coming from warmer regions; and a variety of endemic birds. The bison, which has now completely disappeared from Europe (with the exception of the Byelovyezh forests in western Russia), is still found in the forests of Caucasus; also the same abundance of pheasants as on the Pacific littoral.

Southern and southeastern Asia belong to a separate zoölogical domain. The heights of the Himalayas have the fauna of the Tibet portion of the high plateau; but on their S. slopes the fauna is purely Indian and Transgangetic, while a few African species are found on the plains of India and in the Deccan. As a whole the tropical fauna of Asia is richer than the African. It is characterized by the great number of carnivora, which find refuge in the jungles, and by the elephant, rhinoceros, wild buffalo, red deer, many long-armed apes and half-apes, huge bats, genets, and a variety of serpents and crocodiles; the bird fauna includes vultures, a variety of parrots, pelicans and flamingoes. The fauna is still richer in the Indo-Chinese Peninsula, while in the archipelagos of southeastern Asia several Australian species add to its extent.

Ethnography.—The aggregate population of Asia is estimated at 928,000,000, being thus more than one-half of the entire population of the globe. This population, however, is small, giving only an average of 53 inhabitants per square mile. It is greatest in those parts of Asia which are most favored by rains. The inhabitants of Asia belong to five different groups; the so-called Caucasian (fair type) in western Asia and India; the Mongolian in central and eastern Asia, as also in the Indo-Chinese Peninsula; the Malay in Malacca and the Indian Archipelago; the Dravidas in southeastern India and Ceylon; and the Negritos and Papuas in the virgin forests of the Philippine Islands and Celebes; also a sixth great division comprising the stems which inhabit northeastern Asia, the Hyperboreans, whose affinities are not yet well known. The Mongolian race alone embraces nearly seven-tenths of the population of Asia; the Malay, about two-tenths, and the Caucasian about one-tenth.

Religions.—Asia has been the birthplace of religions; the Jewish, Buddhist, Christian, and Mohammedan having their origin in Asia, where they grow up under the influence of still older religions, the Babylonian and that of Zoroaster, both also of Asiatic origin. At present the inhabitants of Asia belong chiefly to the Buddhist religion, which has 530,000,000 to 560,000,000 of followers, *i. e.*, nearly one-third of mankind. The old faith of Hinduism has 187,000,000 of followers in India. Most of the inhabitants of western Asia, as also of part of central Asia, follow the religion of Islam; they may number about 90,000,000. The Christians number about 20,000,000 in Armenia, Caucasus, Siberia, and Turkestan. Jews are scattered mostly in western central Asia.

Political Conditions.—While the countries beyond the great plateau entered but quite recently within the domain of Western history, those on its Mediterranean slope have never ceased to exercise a powerful influence on Europe. At the very dawn of written history, that is, 50 centuries before our era, the great Akkadian Empire already influenced the inhabitants of the coasts of the Mediterranean. Later on the Phœnicians extended their authority over northern Africa, and the Ægean Sea; the Persians modified the development of Egypt; and at a very remote epoch an oasis of high civilization, grown up at the base of the Altai Mountains, spread itself to the W. over northern Europe. Alexander of Macedon pushed his conquests as far as Turkestan: and, later on, Rome conquered western Asia. But the Greek and Arabian civilization in central Asia decayed under the raids of Mongolian tribes; the Roman empire was absorbed by the East, and fell into decay at the very confines of Asia, on the shores of the Bosphorus; the Arsacides and Sassanides of Persia repulsed the Roman aggression and conquered Roman provinces, while the great migrations of the first centuries of our era were due to mass movements from Asia into Europe. Ural-Altaians migrated to the Urals and thence to Hungary. Other Turanians, the Mervs, the Alans, the Avars, penetrated into Europe from the S. E. Mongols abandoned plateaus, and invaded the Russian plains; the Arabs, following the S. coast of the Mediterranean, invaded Spain; and the empire of the Osmanlis arose on the ruins of the eastern Roman empire. By these invasions, Asia arrested the free development of Europe, and compelled the Germanic, Gallic, and Slavonic federations to gather into powerful states of the Roman monarchical type.

Portuguese ships, rounding the Cape, founded the first European colonies in

Copyr


NORTHERN ASIA
SCALE OF STATUTE MILES
SCALE OF KILOMETERS
Important towns are shown in heavy face type
Railroads
Canals
Longitude 90° East from 100° Greenwich
SWEDEN
NORWAY
RUSSIA
SIBERIA
MONGOLIA
CHINESE EMPIRE
REPUBLIC
TIBET
INDIA
PERSIA
AFGHANISTAN
BALUCHISTAN
ARABIA
KARA SEA
BARENTS SEA
WHITE SEA
GULF OF BOTHNIA
SEA OF OKHOTSK
SEA OF JAPAN
YELLOW SEA
PERSIAN GULF
ARABIAN SEA
BAY OF BENGAL
GULF OF OMAN
RED SEA
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India. They were soon followed by the Spaniards, the Dutch, the French, the Danes, and the British, all endeavoring to seize the richest colonies in Asia. Russia, in the course of a few centuries, conquered and colonized the northwestern slopes of the high plateau and reached the Pacific. Great Britain established herself in India, and took possession of the whole of the peninsula, and extended her power over the western parts of the Indo-Chinese Peninsula. The Portuguese retain in India only Diu, Daman, and Goa; and the French keep Chandernagore, Yanaon, Pondicherry, Charical and Mahé. The next colonial power in Asia is the Dutch, who have under their dominion most of Borneo, Sumatra, Java, Celebes, the Moluccas and the small Sunda Islands. British and French interests are rivals in the Indo-Chinese Peninsula, and, while Burma has become English, the annexation by France of Tonkin and of Siamese territory E. of the Mekhong has consolidated French power in Indo-China. The joint intervention by Russia and France in Chinese affairs after the Japanese War of 1894-1895 further extended both French and Russian influence in Asia.

The Russo-Japanese War, which was in reality a war between the two great powers for the control of Manchuria, resulted in the defeat of Russia and made Japan the preponderant nation in western Asia. She further increased her influence by the absorption of Korea which had become complete by 1920. China, in spite of protests for protection from the domination of Japan, had been obliged to yield in important particulars. Japan was given a stronger hold by the possession of Kiao-Chau peninsula, which became her virtual property on the defeat of the Germans and the capture of Tsingtau early in the World War. For details in regard to the countries of Asia, see under the titles of those countries, as KOREA, CHINA, JAPAN, INDIA, etc.

Trade. — Notwithstanding the difficulties of communication a brisk trade is carried on between the different parts of Asia, but there is no possibility of arriving at even an approximate estimate of its aggregate value. Asia deals chiefly in raw materials, gold, silver, petroleum, teak, and a variety of timberwood, furs, raw cotton, silk, wool, tallow, and so on; the products of her tea, coffee and spice plantations; and a yearly increasing amount of wheat and other grain. Indian cottons of European patterns and jute-stuffs already compete with those of Lancashire and Dundee. Several of the petty trades carried on in India, China, Japan, Asia Minor and some parts of Persia, have been brought to so high a perfection that the silks, printed cottons, carpets, jewelry and cutlery of particular districts far surpass in their artistic taste many like productions of Europe.

ASIA MINOR (Asia the Less, as distinguished from Asia in the widest extent) is the name usually given to the western peninsular projection of Asia, forming part of Turkey in Asia. The late Greek name for Asia Minor is Anatolia—*Anatolé*, "the East," whence is formed the Turkish *Anadŏi*. Asia Minor includes the peninsula; the eastern boundary, somewhat artificial, being a line from the Gulf of Skanderoon to the upper Euphrates and thence to a point E. of Trebizond. The area of the peninsula exceeds 220,000 square miles. It constitutes the western prolongation of the high table-land of Armenia with its border mountain-ranges. The interior consists of a great plateau, or rather series of plateaus, rising in graduation from 3,500 to 4,000 feet, with bare steppes, salt plains, marshes and lakes; the structure is volcanic, and there are several conical mountains, one of which, the Ergish-dagh (Argæus), with two craters, attains a height of 11,830 feet, towering above the plain of Kaisarieh, which has itself an elevation of between 2,000 and 3,000 feet. The plateau is bordered on the N. by a long train of parallel mountains, 4,000 to 6,000 feet high, and cut up into groups by cross valleys. These mountains sink abruptly down on the N. side to a narrow strip of coast; their slopes toward the interior are gentler and bare of wood. Similar is the character of the border ranges on the S., the ancient Taurus, only that they are more continuous and higher, being, to the N. of the Bay of Skanderoon, 10,000 to 12,000 feet, and, farther to the W., 8,000 to 9,000 feet. The W. border is intersected by numerous valleys opening upon the archipelago, to the northern part of which Mounts Ida and Olympus belong. Between the highlands and the sea lie the fertile coast-lands of the Levant. Of the rivers the largest is the Kizil Irmak (Halys), which, like the Yeshil Irmak (Iris), and the Sakaria (Sangarius), flows into the Black Sea; the Sarabat (Hermus) and Meinder (Mæander) flow into the Ægean.

In point of natural history, Asia Minor forms the transition from the continental character of the East to the maritime character of the West. The forest trees and cultivated plants of Europe are seen mingled with the forms characteristic of Persia and Syria. The central plateau, which is barren, has the character of an

Asiatic steppe, more adapted for the flocks and herds of nomadic tribes than for agriculture; while the coasts, rich in all European products, fine fruits, olives, wine, and silk, have quite the character of the S. of Europe, which on the warmer and drier S. coast shades into that of Africa.

The inhabitants, some 10,000,000 in number, consist of the most various races. The dominant race are the Osmanli Turks, who number 7,000,000, and are spread over the whole country; allied to these are the Turkomans and Yuruks, speaking a dialect of the same language. There are also hordes of nomadic Kurds. Among the mountains E. of Trebizond are the robber tribes of the Lazes.

Under Turkish rule the administration of the country fell into eight *vilayets* or governments, with their capitals in Brusa, Smyrna, Konïeh (Iconium), Adana, Sivas, Angora, Trebizond, and Kastamuni respectively.

Here was the early seat of Grecian civilization, and here were the countries of Phrygia, Lycia, Caria, Paphlagonia, Bithynia, Lydia, Pamphylia, Isauria, Cilicia, Galatia, Cappadocia, etc., with Troy, Ephesus, Smyrna, and many other great and famous cities. Here, from the obscure era of Semiramis (about 2,000 years B. C.), to the time of Osman (about 1,300 A. D.), the greatest conquerors of the world contended for supremacy; and here took place the wars of the Medes and Persians with the Scythians; of the Greeks with the Persians; of the Romans with the Mithridates and the Parthians; of the Arabs, Seljuks, Mongols and Osmanli Turks with the weak Byzantine Empire. Here Alexander the Great and the Romans successfully contended for the mastery of the civilized world. But, notwithstanding all these wars, the country still continued to enjoy some measure of prosperity till it fell into the hands of the Turks, under whose military despotism its ancient civilization was sadly brought to ruin. For conditions in Asia Minor which resulted from the World War, see ARMENIA; GREECE; TURKEY; AZERBAIDJAN, REPUBLIC OF; and WORLD WAR.

ASIPHONATA, or **ASIPHONIDA**, an order of *lamellibranchiate*, bivalve mollusks, destitute of the siphon or tube through which, in the siphonata, the water that enters the gills is passed outward. It includes the oysters, the scallop shells, the pearl oyster, the mussels, and in general the most useful and valuable mollusks.

ASKABAD, the administrative center of the Russian province of Transcaspia, Turkestan, on the Trans-Caspian railway, situated in the Akhal Tekke oasis, and occupied by Skobeleff in January, 1881, after the sack of Geok Tepé. Its distance from Merv is 232 miles, from Herat 388 miles. It is of considerable commercial importance. Pop. about 50,000.

ASKJA (ask'ya), a volcano near the center of Iceland, first brought into notice by an eruption in 1875. Its crater is 17 miles in circumference, surrounded by a mountain-ring from 500 to 1,000 feet high, the height of the mountain itself being between 4,000 and 5,000 feet.

ASMONÆANS (az-mōn-ē'ans), a family of high priests and princes who ruled over the Jews for about 130 years, from 153 B. C., when Jonathan, son of Mattathias, the great-grandson of Chasmon or Asmonæus, was nominated to the high priesthood. They were also known as the Maccabees.

ASOKA, an Indian sovereign, who reigned 255-223 B. C. over the whole of northern Hindustan, grandson of Chandragupta or Sandracottus. He embraced Buddhism, and forced his subjects also to become converts.

ASP, or **ASPIC**, the kind of serpent peculiar to Egypt and Libya, which has obtained great celebrity from having been chosen by Cleopatra to give her an easy death. Its poison is so quick and deadly in its operation that it kills without a possibility of applying any remedy. It is believed to have been the *naia haje*. It is the same genus as the cobra capello, but differs in having the neck less wide, and having the color greenish, bordered with brown. It is probably the asp (*aspis*) of the New Testament (Rom iii: 13). The common asp or chersæa (*vipera aspis*) is olive above, with four rows of black spots. Its poison is severe. It is common in southern Europe, the Alpine region, and is found as far north as Sweden.

ASPARAGUS, a plant of the order *liliaceæ*, the young shoots of which, cut as they are emerging from the ground, are a favorite culinary vegetable. In Greece, and especially in the southern steppes of Russia and Poland, it is found in profusion; and its edible qualities were esteemed by the ancients. It is usually raised from seed; and the plants should remain three years in the ground before they are cut; after which, for 10 or 12 years, they will continue to afford a regular annual supply. The beds are protected by straw or litter in winter. Its diuretic properties are as-

cribed to the presence of a crystalline substance found also in the potato, lettuce, etc.

ASPASIA (as-pā'zē-a), a celebrated Grecian, belonging to a family of some note in Miletus, and was early distinguished for her graces of mind and person. She went to Athens after the Persian War, and by her beauty and accomplishments soon attracted the attention of the leading men of that city. She engaged the affections of Pericles, who is said to have divorced his former wife in order to marry her. Their union was harmonious throughout. Their house was the resort of the wisdom and wit of Athens. Plato says that she formed the best speakers of her time, and, chief among them, Pericles himself. The sage Socrates was a frequent visitor at her salons, drawn thither, it is insinuated, by the double attraction of eloquence and beauty. Anaxagoras, Phidias, and Alcibiades were also numbered among her admirers. The envy which assailed the administration of Pericles was unsparing in its attacks on his mistress. Her fearless speculation aroused their superstitious zeal. She shared the impeachment, and narrowly escaped the fate, of her friend Anaxagoras. She was accused by Hermippus of disloyalty to the gods, and of introducing freed women into her house to gratify the impure tastes of Pericles. He himself pleaded her cause triumphantly, and Aspasia was acquitted. She survived Pericles some years.

ASPEN, a tree, the *populus tremula* or trembling poplar. The tremulous movement of the leaves which exists in all the poplars, but culminates in the aspen, mainly arises from the length and slender character of the petiole or leaf-stalk, and from its being much and laterally compressed.

ASPERN, a small village of Austria, on the Danube, about 2 miles from Vienna. Here, and in the neighboring village of Esslingen, were fought the tremendous battles of the 21st and 22d of May, 1809, between the French grand army, commanded by Napoleon, and the Austrians under the Archduke Charles, resulting in great losses to both sides. The French were obliged to retreat to the island of Lobau, from where they withdrew to the right bank of the Danube.

ASPHALT, or **ASPHALTUM**, the most common variety of bitumen; also called mineral pitch. Asphalt is a compact, glossy, brittle, black or brown mineral, which breaks with a polished fracture, melts easily with a strong pitchy odor when heated, and when pure burns without leaving any ashes. It is found in the earth in many parts of Asia, Europe, and the United States, and in a soft or liquid state on the surface of the Dead Sea, which, from its circumference, was called Asphaltites. It is of organic origin, the asphalt of the great Pitch Lake of Trinidad being derived from bituminous shales, containing vegetable remains in the process of transformation. Asphalt is produced artificially in making coal gas.

What is known of asphalt rock is a limestone impregnated with bitumen, found in large quantities in Switzerland, France, Hanover, Holstein, Sicily, and other parts of Europe, and in the United States, the purest forms taking the names of elaterite, gilsonite, albertite, maltha, brea, etc. In the trade there is wide distinction between these and the sandstones, and limestones impregnated with bitumen, which are known as bituminous or asphaltic limestone, sandstone, etc. The latter are usually shipped without being previously treated or refined, and are used principally in street paving.

The production of asphalt in the United States, produced from domestic petroleum, was in 1918, 527,575 tons, valued at $7,435,204. There were produced from Mexican petroleum in the same year 650,244 tons, valued at $10,-324,200. The production of bitumines and allied substances in 1918 amounted to 60,034 tons, valued at $780,808. The crude asphalt imported into the United States in 1918 amounted to 114,686 short tons, valued at $624,967. There were exported in the same year 22,108 tons, valued at $577,654.

ASPHODEL, the English name of the plants belonging to the genus *asphodelus*. The yellow and white species were introduced into this country during the 16th century—the former about the year 1596, and the latter in 1551. The asphodels, being sacred to Proserpine, were used in classic times in funeral ceremonies, and the souls of the departed were supposed by the poets to wander in meadows adorned with these beautiful flowers.

In botany, a genus of plants belonging to the order *liliaceæ* and the section *anthericeæ*. About eight species are familiar, the best known being *A. luteus*, the yellow; *A. albus*, the white; and *A. ramosus*, the branched lily, or asphodel, called also king's rod. To this family belong the garlic, the hyacinth, the squill, and the Star of Bethlehem.

ASPHYXIA, suspended animation; an interruption of the arterialization of the blood, causing the suspension of sensation and voluntary motion. It may be produced by breathing some gas incapable of furnishing oxygen by submersion under water, by suffocation, from an impediment to breathing applied to the mouth and nostrils, by strangulation, or by great pressure, external or internal, upon the lungs. If asphyxia continue unrelieved for a short period, it is necessarily followed by death.

ASPHYXIATING GAS. This new and terrible weapon was introduced into the World War by the German military authorities. At the battle of Ypres, April 22, 1915, it was used for the first time in warfare. The idea itself was not new. Dundonald, an eminent British chemist, who was born in 1775 and died in 1860, had informed his Government that it was possible to produce asphyxiating gas of such a character and in such

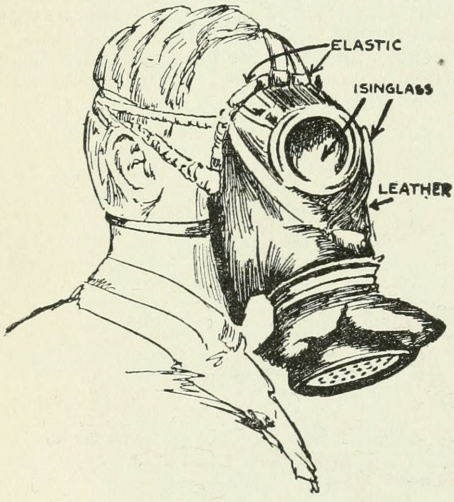


DIAGRAM OF GAS MASK

quantities as to make it a formidable weapon of offense. That Government, however, had rejected the idea as being too inhuman. The Hague Convention of 1899 had expressly condemned its use. The conception therefore was by no means novel to military chiefs. It remained for Germany to initiate its use in battle.

The first gas attack produced almost a panic. The soldiers who gazed wonderingly at the clouds of chlorine gas creeping toward them suddenly found themselves gasping for breath or convulsed with terrible agony. There is but little doubt but that at that time, if the Germans had been able to use a greater amount than their supplies permitted or if they had sensed to the full the effect it was producing in their enemies'

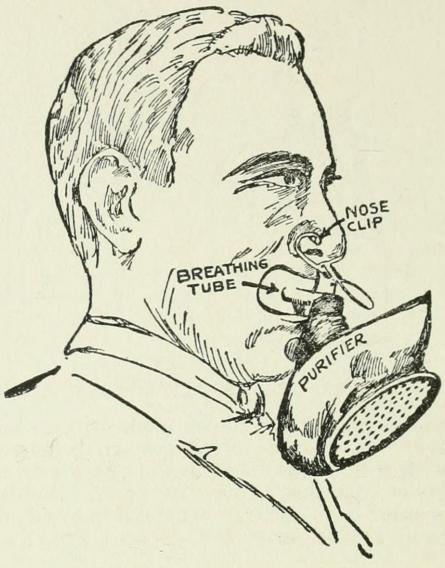
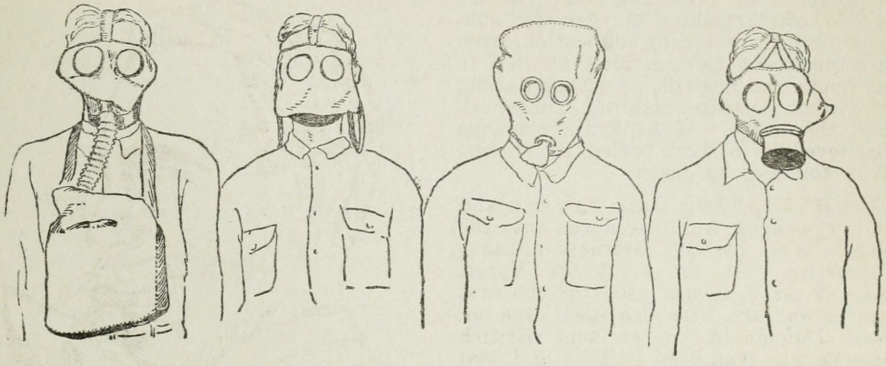


DIAGRAM OF GAS MASK

ranks, they could have broken through and reached the Channel. As it was, the quantity was limited, and all the resources of the Allied scientific world were employed at once to neutralize the effects of this new and deadly weapon. It was speedily discovered that the only defense was the use of gas masks, in which charcoal and other chemicals were able to absorb the gas or render it innocuous.

Later on, wincing under the charges of inhumanity and anxious to forestall the reprobation of the neutral world, the Germans charged that the gas had been previously used by the British and the French on March 1, 1915. This was demonstrated to be a pure invention. It is certain that long before the end of the war, the German authorities regretted having brought asphyxiating gas into general use, for it was turned on them with deadly effect by the Allies, who, being forced to "fight fire with fire," adopted it as a necessary retaliation. Allied energy and ingenuity developed the gas in far greater quantities than was possible for the Germans, and used it with much effect. Moreover the meteorological conditions in the zone of warfare favored the Entente, because the winds for 75 per cent. of the time set toward the German lines. At the time the armistice was signed, America was produc-

ing the gas in such enormous quantities that it could have brought about the annihilation of whole armies. Giant containers were being prepared that would hold a ton of gas, which could be carried over fortresses by airplanes and released with a time fuse that would operate at a given distance above the forts. Being heavier than air, the mustard gas would have settled over the doomed fortress, making it impossible for any living thing within its radius to survive.



TYPICAL GAS MASKS. FROM LEFT TO RIGHT, AMERICAN, BRITISH, FRENCH, GERMAN

Various gases differing in characteristics were employed. The less virulent put the soldier hors de combat without causing death. Such was the lachrymatory gas, that caused tears to flow so freely that the soldier could not use his weapon nor the gunner see his sights. By far the most atrocious was mustard gas, that ate through clothes and into flesh like vitriol. Chlorine gas produced suffocation and the lungs of the sufferer sometimes burst in the effort to breathe. Sneezing powder was also used, which percolated through the gas respirators and brought on sneezing spells, which led the men to take off their masks and thus be easily killed by phosgene and diphosgene gases, which were timed to reach the spot while the masks were removed. The Germans did not depend wholly on a favorable wind for the dissemination of gas. Hand grenades and long range artillery shells filled with gas carried it into the trenches of their enemies. Not content with single guns, they often used twelve or more mortars,

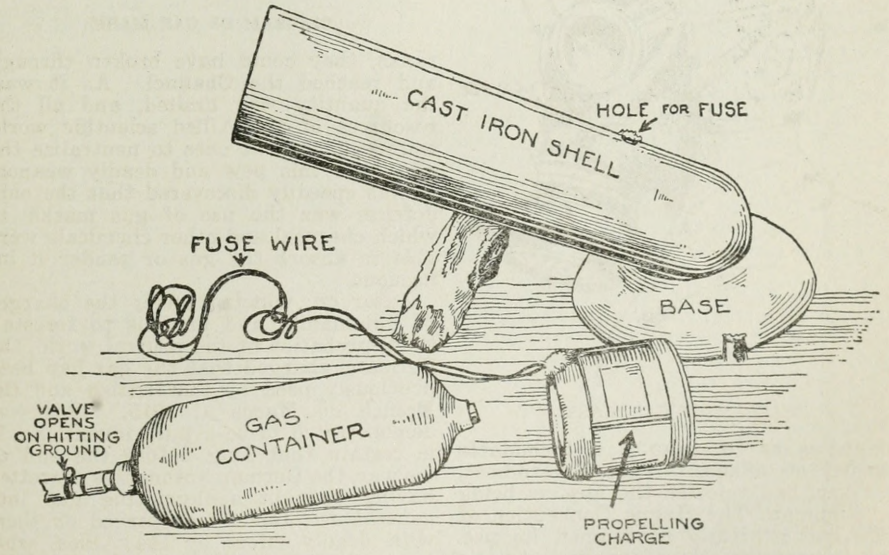


DIAGRAM OF GAS GUN AND GAS SHELL

shooting large caliber shells at the same instant, the firing being produced by an electrical current that set the guns off simultaneously, thus producing a powerful concentration on their target.

The adoption of gas made necessary the addition of new units to the army organization. A Chemical Warfare Service was made an important branch of the American and other armies. Its functions consisted in the "operation and maintaining or supervising the operation and maintaining of all plants engaged in the investigation, manufacture or production of toxic gases and proving grounds used in connection therewith, gas defense appliances, the filling of gas shells, and the necesary research connected with gas warfare." The organization provided for various units, each with its special work. The most important of these were the Gas Defense Production, which supervised the making of gas masks; the Gas Offense Production, which concerned itself with the making of gas for the purpose of attack; and the Training Section, which taught to officers and men the approved methods of gas warfare.

On the battle fronts the utmost care was taken by means of signs and sounds to protect the troops. Sirens, horns, and bells were sounded to warn of an impending attack. Signs were posted bearing the legend "Gas Alert On" and "Gas Alert Off," the former meaning that the ground was dangerous and that masks must be carried in front for instant use, while the latter permitted less caution. Special training was given in rapidity of adjustment, and the regulations required that the mask be put on in six seconds or less. The mask itself became more effective, especially in the case of the American mask by the use of "soda lime" produced by a secret process. Constant drill and warning proved so effectual that the casualties were greatly diminished, and toward the end of the war it became almost a maxim that a soldier who was "gassed" owed his misfortune to his own carelessness. See WORLD WAR.

ASPIDIUM, a genus of ferns belonging to the order *polypodiaceæ*. There are 10 British species. Some have orbicular peniform involucres fixed by their sinuses, while others have orbicular and peltate involucres. To the former, sometimes called *lastrea*, belong the *A. filix mas*, or blunt; the *A. spiculosum*, or prickly toothed; the *A. oreopteris*, or heath; and the *A. thelypteris*, or marsh shield fern, with other species more rare; and to the latter, the *A. lonchitis*, or rough alpine; the *A. lobatum*, or close-leaved prickly; the *A. aculeatum*, or soft prickly; the *A. angulare*, or angular-leaved shield fern.

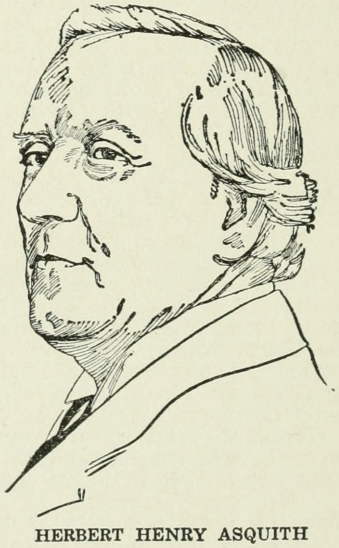
ASPINWALL. See COLON.

ASPIRATOR, an instrument used in chemistry to draw gases through bottles or other receptacles. It is a tight vessel containing water; a tube with a stop cock extends from the upper end and another tube also with a stop cock from the lower end. The first tube is fastened to the receptacle from which gas is to be drawn; both stop cocks are opened, and the water flowing from the lower tube acts as a suction and draws the gas.

ASPLENIUM, a genus of ferns, of the natural order *polypodiaceæ*. Several are natives of the United States. The dwarf spleenwort is a very beautiful little fern.

ASPROMONTE, a mountain of Italy, in the S. W. of Calabria, where Garibaldi was wounded and taken prisoner with the greater part of his army, in August, 1862.

ASQUITH, HERBERT HENRY, an English statesman and lawyer, born in Morley, Yorkshire, on Sept. 12, 1852. He was educated at Oxford and shortly



HERBERT HENRY ASQUITH

after his graduation was admitted to the bar. In 1887 he appeared in the defense of John Burns, labor leader, during the latter's trial for his participation in the so-called riot in Trafalgar Square, in London. Two years later he was one of the counsel of the Irish Nationalists before the Parnell Commission. He was

elected to Parliament in 1886 and in 1892 he was made Secretary of State for the Home Department. He took an active part in the Home Rule debates, becoming one of the most conspicuous figures in the House. In 1894 he drew up the bill providing for the disestablishment of the Church of Wales and supported that measure until its rejection by the House. He resigned his seat in the Cabinet in 1895, following the defeat of the Liberal party, but continued in Parliament as a member of the Opposition. During this period the Conservative party gained ascendancy and Asquith's reputation steadily increased. He supported the Government throughout the Boer War but defended free trade following the movement for protection led by Joseph Chamberlain. He was appointed Chancellor of the Exchequer in the Ministry of Sir Henry Campbell-Bannerman, when the Liberals regained power in 1905. In 1908 he was appointed Prime Minister and took an aggressive part in the formulation of the Liberal reform program. Many important measures were passed during this period, the most important of which was the law depriving the House of Lords of its veto power following the rejection by the House of Lords of the budget of 1909. He won the hostility of the advocates of woman suffrage on account of his opposition to that movement. He finally consented to permit an equal suffrage amendment to the electoral bill of 1912, but owing to a technical ruling it was necessary to withdraw the entire bill. He was accused of betraying the suffrage cause and the attitude of the woman suffrage leaders became even more hostile than before. From 1908 to 1916 he held the position, not only of Prime Minister, but of First Lord of the Treasury. At the outbreak of the European War he also took over the office of the Secretary of State for War. His attitude as Prime Minister at the outbreak of the World War was patriotic and he supported all measures undertaken to bring Great Britain into active participation following the declaration of war with Germany. As the war progressed, however, he was considered to be overcautious and lacking in energy and decision. He was succeeded as Prime Minister by Lloyd George in 1916. In the elections of 1919 he was defeated for Parliament, but was re-elected on Feb. 25, 1920, as a member from Paisley, Scotland. He at once took the place of the leader of the Opposition, and opposed strongly most of the measures relating to Ireland and the industrial situation in England brought forward by Lloyd George in the House of Commons.

ASRAEL, the Mohammedan angel of death, who takes the soul from the body.

ASS (*asinus*), a genus of *perissodactyla* closely relatel to the horse. The domestication took place at an early date, probably before that of the horse, from a type like the present Abyssinian ass (*A. tæniopus*), and apparently in Asia; but the donkey has been common in England only since Queen Elizabeth's time. The dwarfing and degeneration so generally exhibited are the results rather of ill-treatment and careless breeding than of uncongenial climate, as the condition of the domesticated forms in some favorable parts of the East plainly indicates. In Arabia, Syria, Egypt, Spain, Kentucky, and elsewhere, the asses are well cared for, and the breed has been considerably varied and improved; a Spanish he-ass of a good breed may be worth $1,000. The mule is a hybrid bred between mare and male ass, while the hinny is the rarer result of hybridism between horse and female ass. The mule is much nearer in temper and appearance to the ass than to the horse; the hinny in some points resembles the horse more, as it neighs, while the mule brays like the ass.

The various species of wild asses are handsomer in form than the familiar degenerate donkey. They have shorter ears, and longer, finer limbs. The shy, swift *A. onager* occurs in herds in the Asiatic deserts, migrating southward in winter. The large, handsome *A. hemionus*, with dark stripes on its back, inhabits high plateaus from Tibet to Mongolia. The Abyssinian form has been already noted as the probable ancestor of the donkey. The even wilder zebras and quaggas will be discussed separately. The wild ass is hunted in the East, *e. g.*, in Persia; and the flesh of the hardly-won booty is much esteemed. The milk of the ass is more sugary and less cheesy than that of the cow, and is on that account recommended to some invalids—*e. g.*, consumptives. The leather called shagreen is made by a peculiar process from the skin, which is also utilized for shoes and drums.

ASSAB BAY, an Italian trading station on the W. coast of the Red Sea, 40 miles N. W. of the Strait of Bab-el-Mandeb. The district around it, with an area of 243 square miles, and 1,300 inhabitants, was sold in 1870 by some Danakil chieftains to an Italian steamship company for a coaling station on the road to India. In 1880 it was taken over by the Italian Government, who, since 1884, have improved the harbor and erected a lighthouse.

ASSAL, a large salt lake in the district of Adal, in eastern Africa, nearly 9 miles from the coast of the Bay of Tajurrah. It is nearly 600 feet below the level of the sea. Abyssinian caravans resort to Assal for the purpose of carrying off the salt, which is thickly incrusted on its shores.

ASSAM, a province at the N. E. extremity of British India, stretching in N. lat. between 23° and 28°, and in E. long. between 89° and 97° with an area of 61,471 square miles and a population of about 7,500,000. In 1874 it was formed into a separate administration (including Cachar) under a chief commissioner. It consists of a fertile series of valleys, watered by the Brahmaputra and more than 60 lesser rivers. It is thus very fertile, and abounds in wood. The tea-plant is indigenous and Assam's tea culture has become of first importance. The other products are rice, mustard, gold, ivory, amber, musk, iron, lead, petroleum, and coal. From Bengal, the principal imports are woolens, India fabrics, salt, opium, glass, earthenware, tobacco, betel, etc. The development of the rich coal fields is of increasing importance.

In 1826, at the close of the first Burmese war, Assam was ceded to the British. But it was only in 1838 that the entire country was placed under British administration. Since then, the province has exhibited a noticeable improvement. The population being rural and agricultural, the only towns of any size are Gauthâti and Sebságar. The peasantry are indolent, good-natured, and fairly prosperous, short and robust in person, with a flat face and high cheek-bones, and coarse, black hair. A majority of the people are Hindus. One of the most striking features of Assam is the abundance of wild animals, such as tigers, rhinoceroses, leopards, bears, buffaloes, and elephants. Many people are killed by wild animals, but snakes are most destructive to human life. The forests teem with game, and the rivers with fish.

ASSASSINATION, the act of taking the life of anyone by surprise or treacherous violence either by a hired emissary, by one devoted to the deed, or by one who has taken the task upon himself. Generally, the term is applied to the murder of a public personage by one who aims solely at the death of his victim. In ancient times, assassination was not unknown, and was often even applauded, as in the Scriptural instances of Ehud and Jael, and in the murder of Hipparchus by Harmodius and Aristogeiton; but assassination by enthusiasts and men devoted to an idea first became really prominent in the religious struggles of the 16th and 17th centuries. To this class belong the plots against the life of Queen Elizabeth of England; while the horrible succession of assassinations of Roman emperors is simply a series of murders prompted by self-interest or revenge. In modern times assassination is usually based on political motives. See ANARCHISM.

ASSASSINS, or **ISMAILI**, a sect of religious fanatics who existed in the 11th and 12th centuries. They derived their name of assassins originally from their immoderate use of *hasheesh*, which produces an intense cerebral excitement, often amounting to fury. Their founder and law giver was Hassan-ben-Sabah, to whom the Orientals gave the name of Sheikh-el-Jobelz, but who was better known in Europe as the "Old Man of the Mountain"; he was a wily impostor, who made fanatical and implicit slaves of his devotees, by imbuing them with a religion compounded of that of the Christians, the Jews, the Magi, and the Mohammedans. The principal article of their belief was that the Holy Ghost was embodied in their chief, and that his orders proceeded from the Deity, and were declarations of the divine will. They believed assassination to be meritorious when sanctioned by his command, and courted danger and death in the execution of his orders. In the time of the crusades, they mustered to the number of 50,000. So great was the power of the Sheikh, that the sovereigns of every quarter of the globe secretly pensioned him. For a long time this fearful sect reigned in Persia, and on Mt. Lebanon. Holagoo, or Hulaka, a Mogul Tartar, in 1254, dispossessed them of several of their strongholds; but it was not till some years after that they were extirpated partially by the Egyptian forces sent against them by the great Sultan Bibars. A feeble residue of the Ismaili has survived in Persia and Syria. The Syrian Ismaili dwell around Mesiode, W. of Homar, and on Lebanon; they are under Turkish dominion, with a sheikh of their own, and formerly enjoyed a productive and flourishing agriculture and commerce.

ASSAYING, the estimation of the amount of pure metal, and especially of the precious metals, in an ore or alloy. In the case of silver, the assay is either by the dry or by the wet process. The dry process is called cupellation, from the use of a small and very porous cup, called a cupel, formed of well burned and finely ground bone ash made into a

paste with water. The cupel, being thoroughly dried, is placed in a fire clay oven. This oven, called a muffle, is set in a furnace, and when it is at a red heat the assay, consisting of a small weighted portion of the alloy wrapped in sheet lead, is laid upon the cupel. The heat causes the lead to volatilize or combine with the other metals, and to sink with them into the cupel, leaving a bright globule of pure metallic silver, which gives the amount of silver in the alloy operated upon. In the wet process the alloy is dissolved in nitric acid, and to the solution are added measured quantities of a solution of common salt of known strength which precipitates chloride of silver. The operation is concluded when no further precipitation is obtained on the addition of the salt solution, and the quantity of silver is calculated from the amount of salt solution used. An alloy of gold is first cupelled with lead as above, with the addition of three parts of silver for every one of gold. After the cupellation is finished, the alloy of gold and silver is beaten and rolled out into a thin plate, which is curled up by the fingers into a little spiral, or cornet. This is put into a flask with nitric acid, which dissolves away the silver and leaves the cornet dark and brittle. After washing with water, the cornet is boiled with stronger nitric acid to remove the last traces of silver, well washed, and then allowed to drop into a small crucible, in which it is heated, and then it is weighed.

ASSAY OFFICES, in the United States, government establishments in which citizens may deposit gold and silver bullion, receiving in return its value, less charges. The offices are in New York City; Boise City, Ida.; Helena, Mont.; Denver, Col.; Deadwood, S. D.; Salt Lake City, Utah; Carson, Nev.; New Orleans, La.; Seattle, Wash.; San Francisco, Cal.; Charlotte, N. C.; and St. Louis, Mo.

ASSEGAI, a spear used as a weapon among the Kaffirs of South Africa, made of hard wood tipped with iron, and used for throwing or thrusting.

ASSEMBLY, CONSTITUENT. See ASSEMBLY, NATIONAL.

ASSEMBLY, GENERAL, an official name of the supreme ecclesiastical court of the Established Church of Scotland, of the Free Church of Scotland, of the Presbyterian Church in Ireland, and of the two Presbyterian Churches in the United States. The term is also used in the United States to designate the dual legislative body of the several States, the branches being commonly spoken of as the Senate and the House (of Representatives).

ASSEMBLY, NATIONAL, a body set up in France on the eve of the Revolution. Upon the convocation of the States-General by Louis XVI., the privileged nobles and clergy refused to deliberate in the same chamber with the commons, or *tiers-état* (third estate). The latter, therefore, on the proposition of the Abbé Siéyès, constituted themselves an *Assemblée Nationale*, with legislative powers (June 17, 1789). They bound themselves by oath not to separate until they had furnished France with a constitution, and the court was compelled to give its assent. In the 3,250 decrees passed by the Assembly were laid the foundation of a new epoch, and having accomplished this task, it dissolved itself, Sept. 30, 1791. The term is also applied to a joint meeting of the Senate and Corps Legislatif, for the purpose of electing a chief magistrate or the transaction of other extraordinary business.

ASSETS (French, *assez*, enough), property or goods available for the payment of a bankrupt or deceased person's obligations. Assets are personal or real, the former comprising all goods, chattels, etc., devolving upon the executor as salable to discharge debts and legacies. In commerce and bankruptcy the term is often used as the antithesis of liabilities, to designate the stock in trade and entire property of an individual or an association.

ASSIDEANS, CHASIDEANS, or **CHASIDIM**, one of the two great sects into which, after the Babylonian captivity, the Jews were divided with regard to the observance of the law—the Chasidim accepting it in its later developments, the Zadikim professing adherence only to the law as given by Moses. From the Chasidim sprang the Pharisees, Talmudists, Rabbinists, Cabbalists, etc.

ASSIGNATS (as-ē-nyä'), the name of the national paper currency in the time of the French Revolution. Assignats to the value of 400,000,000 francs were first struck off by the Constituent Assembly, with the approbation of the King, April 19, 1790, to be redeemed with the proceeds of the sale of the confiscated goods of the Church. On Aug. 27, of the same year, Mirabeau urged the issuing of 2,000,000,000 francs of new assignats, which caused a dispute in the Assembly. Mirabeau's exertions, however, were seconded by Péthion and 800,000,000 francs more were issued.

They were increased by degrees to 45,578,000,000, and their value rapidly declined. They were withdrawn by the Directory from the currency, and at length redeemed by mandate at one-thirtieth of their nominal value.

ASSIGNEE, a person appointed by another to transact some business, or exercise some particular privilege or power. Formerly the persons appointed under a commission of bankruptcy, to manage the estate of the bankrupt on behalf of the creditors, were so called, but now trustees, or receivers.

ASSINIBOIA, the smallest of the four districts into which a portion of the Northwest Territories of Canada was divided in 1882. It lay immediately to the W. of Manitoba, with Saskatchewan and Alberta as its N. and W. boundaries. It was intersected by the Saskatchewan (South Branch) and the Qu'Appelle rivers. It was abolished in 1905, and is now included in the provinces of Saskatchewan and Alberta. Area, 89,535 square miles. Regina, on the Canadian Pacific railway, was the capital.

ASSINIBOIN, a tribe of North American Indians, living principally in the N. W. part of the Dominion of Canada.

ASSINIBOINE, a river of Canada, which flows through Manitoba and joins the Red river at Winnipeg, about 40 miles above the entrance of the latter into Lake Winnipeg, after a somewhat circuitous course of about 500 miles from the W. and N. W. Steamers ply on it for over 300 miles. The river derives its name from Assiniboine, a branch of the Sioux Indians.

ASSISI (as-sē'sē), a town in Italy, in the province of Umbria, 20 miles N. of Spoleto, the see of a bishop, and famous as the birthplace of St. Francis d'Assisi. The splendid church built over the chapel where the saint received his first impulse to devotion is one of the finest remains of medieval Gothic architecture. Pop. about 20,000.

ASSIZES, a term chiefly used in England to signify the sessions of the courts held at Westminister prior to Magna Charta, but thereafter held annually in every county. Twelve judges, who are members of the highest courts in England, twice in every year perform a circuit into all the counties into which the kingdom is divided, to hold these assizes, at which both civil and criminal cases are decided.

ASSOCIATED PRESS. Organization for gathering and distributing news.

ASSOCIATION OF IDEAS. See PSYCHOLOGY.

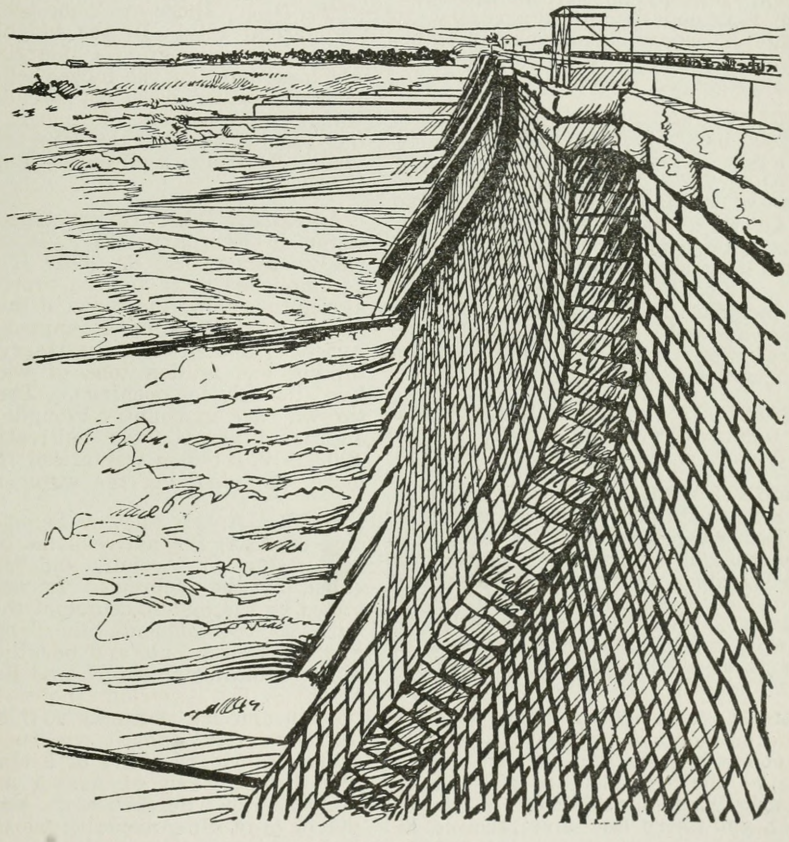
ASSONANCE, in poetry, a term used when the terminating words of lines have the same vowel sound, but make no proper rhyme.

ASSOUAN (as-ö-än'), (also ESWAN; the ancient Syene), is the southernmost city of Egypt proper, on the right bank of the Nile. There are some remains of the ancient city. In the neighborhood are the famous granite quarries from which so many of the huge obelisks and colossal statues were cut to adorn the temples and palaces of ancient Egypt. It is from Syene that this kind of granite came to be known as syenite. Pop. about 17,500.

ASSOUAN DAM. Its construction was begun in February, 1899. It was formally opened Dec. 8, 1902. This dam accomplished more for the promotion of agriculture along the banks of the Nile in Egypt than anything attempted in centuries. The dam formed a reservoir containing one million tons of water. It had 180 sluice openings. The water thrown back up-country brought 300,000 additional acres under cultivation. In 1907-1912, the dam was raised 16½ feet, more than doubling the water supply.

ASSYRIA, an ancient Semitic kingdom of Asia, the native name of which was Ashur or Asshur, and thus also called by the Hebrews. It was intersected by the middle course of the Tigris with its two affluents, the Upper Zab and the Lower Zab, and had the Armenian Mountains on the N. and Babylonia on the S. The Assyrian conquests during the 8th and 7th centuries B. C. enlarged its boundaries, and at one time it included Babylonia, parts of Elam, Palestine, Egypt, parts of Arabia and Asia Minor. The chief cities of Assyria in the days of its prosperity were Ashur, the most ancient, then Nineveh, the site of which is marked by mounds opposite Mosul (Nebi Yunus and Koyunjik), Calah or Kalakh (the modern Nimrud), Dur-Sargina (Khorsabad), and Arbela (Arbil). Lower down the Tigris exhibits a line of ruins from Telkrit to Bagdad. The country, probably some time before the 16th century B. C., became independent. At the end of the 14th century its king, Shalmaneser, is said to have founded the city of Calah; his son Tiglath-ninip conquered the whole of the valley of the Euphrates. The following five reigns were chiefly occupied by wars with the Babylonians. About 1120, a date fixed by Sennacherib, 705-681 B. C.,

Tiglath-pileser I., one of the greatest of the sovereigns of the first Assyrian monarchy, ascended the throne, and carried his conquests to the Mediterranean on the one side and to the Caspian and the Persian Gulf on the other. At his death ensued a period of decline, which lasted over 150 years. Under Assur-nasir-pal, who reigned from 884 to 859 B. C., Assyria once more advanced to the position of the leading power in the world, his kingdom being greater in extent than that of Tiglath-pileser.

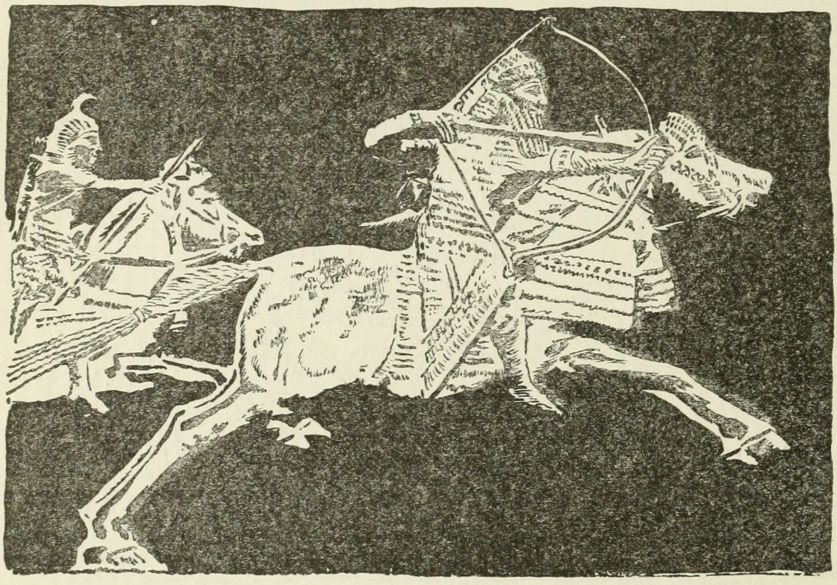


THE ASSOUAN DAM

History.—In 859 Assur-nasir-pal was succeeded by his son Shalmaneser II. (859-824), who was the first Assyrian king to have relations with Israel, and whose annals are found inscribed on the famous Black Obelisk in the British Museum, and on the bulls and slabs from his palace at Calah. His career of conquest was equally successful. He reduced Babylon to a state of vassalage, and came into hostile contact with Benhadad and Hazael of Damascus, and with Ahab, son of Omri, and Jehu of Israel, from whom he exacted tribute, as also from the kings of Tyre and Sidon. The old dynasty came to an end in the person of Assurnirari II., who was driven from the throne by a usurper, Tiglath-pileser III., in 745, after a struggle of some years. He was the first Assyrian king mentioned by the Hebrews, identical with Pul. No sooner was this able ruler firmly seated on the throne than he made an expedition into Babylonia, followed by another to the east in 744. A year later he defeated the confederate princes of Armenia, Syria, etc., and, advancing against Syria, overthrew the ancient kingdoms of Damascus and Hamath, and in 733 he placed his vassal Hosea on the throne of Samaria. Having reduced the west to submission the Assyrian King now attacked Chaldea, and, after a severe war, commencing in 731 B. C., he defeated and slew Ukin-ziru, the Kinziros of the Canon of Ptolemy, and was proclaimed King of Sumir and Akkad, in 729 B. C. Tiglath-

pileser carried the Assyrian arms from Lake Van on the N. to the Persian Gulf on the S., and from the confines of Susiana on the E. to the Nile on the W. He was, however, driven from his throne by Shalmaneser IV. (727), who blockaded Tyre for five years, invaded Israel, and besieged Samaria, but died before the city was reduced.

Conquests under Sargon.—His successor, Sargon (722-705), a usurper, claimed descent from the ancient Assyrian kings. After taking Samaria and leading over 27,000 people captive, he overthrew the combined forces of

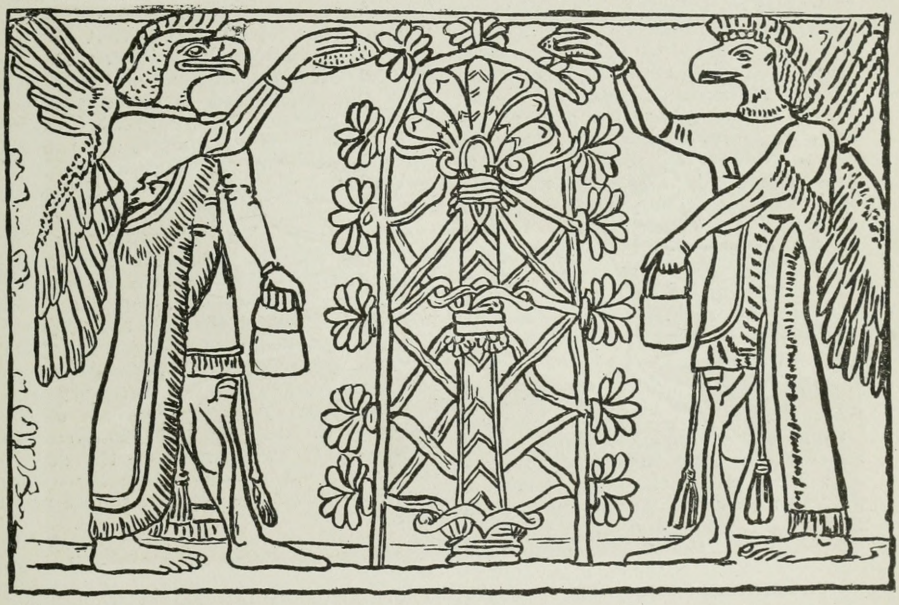


ASHUR-BANIPAL, CONQUEROR OF EGYPT. FROM AN ASSYRIAN RELIEF TABLET

Elam (Susiana) and Babylon. He defeated the King of Hamath, who, with other princes, had revolted, took him prisoner, and flayed him alive; advanced through Philistia, and captured Ashdod; then, pushing southward, totally defeated the forces of Egypt and Gaza, at Raphia (719). The revolted Armenians had also more than once to be put down. In 710 Merodach-baladan was driven out of Babylonia by Sargon, after holding it for 12 years as an independent king, and being supported by the Kings of Egypt and Palestine; his allies were also crushed, Judah was overrun, and Ashdod leveled to the ground. Sargon afterward crossed over and took Cyprus, where he left an inscription telling of his expedition. He spent the latter years of his reign in building, in the midst of which he was murdered during a revolt of the soldiers in the new palace, in 705 B. C. Sennacher-ib at once had to take up arms against Merodach-baladan, who had again obtained possession of Babylon. In 701 fresh outbreaks in Syria led him in that direction. He captured Sidon and Askelon, defeated Hezekiah and his Egyptian and Ethiopian allies, and forced him to pay tribute, after which he returned to Assyria to overawe the Babylonians, Elamites, and the northern hill tribes. On Dec. 20, 681, he was murdered by his two sons, Adrammelech and Sharezer, but they were defeated by their brother Esar-haddon, who then mounted the throne. Esar-haddon took the title King of Sumer and Akhad. The most important event of this reign was the conquest of Egypt, about 670. It was reduced to a state of vassalage, the Ethiopian ruler, Tirhakah, was driven out and the land was divided into 20 separate kingdoms, the rulers of which were the vassals of Esar-haddon. He associated the eldest of his four sons, Asshur-banipal, with him in the government of the kingdom (669), and, one year later, this prince (the Sardanapalus of the Greeks) became king.

Beginning of the Decline.—In 652 a general insurrection broke out. Egypt declared her independence, Syria was in revolt, Elam and the N. E. provinces refused tribute, and Kandalanu, the new Viceroy of Babylon, proclaimed himself King, while his successor, Nabopolassar,

father of Nebuchadnezzer, openly threw off all semblance of his allegiance and declared himself king. The last Assyrian King was Esar-haddon II. (the Sarakos of Ctesias), in whose reign Babylon definitely threw off the Assyrian yoke. There are some tablets relating to this prince which show that during his rule the N. E. provinces were invaded by a powerful confederation of Aryan and Turanian tribes, Medes, Cimmerians, and Armenians, under the command of Cyaxares. The meager character of the inscriptions about this date, and the apparent number of claimants to the throne, indicate that after the death of Asshur-



ASSYRIAN SCULPTURE. THE SACRED TREE, WITH EAGLE-HEADED DEITIES

banipal a period of disruption and anarchy set in, followed, about 606 B. C., by the siege and destruction of Nineveh by the combined forces of Cyaxares and Nabopolassar. Assyria became a Median province in 606 B. C., and afterward, in conjunction with Babylonia, formed one of the satrapies of the Persian Empire. In 312 B. C. Assyria became part of the kingdom of the Seleucidæ, whose capital was Seleucia, on the Tigris. It was afterward subject to the Parthian kings, whose capital was Ctesiphon, and was more than once temporarily in possession of the Romans. When the Persian monarchy of the Sassanidæ, which succeeded that of the Parthians, was destroyed by the Mohammedans, Assyria was subject to the caliphs, whose seat was at Bagdad from 762 A. D. till 1258. It has been under the Ottoman Turks from 1638, at which period it was wrested from the Persians.

People and Language.—The Assyrians belonged to the northern branch of the Semitic family, a race of people who spread over the country and mingled with or supplanted the original inhabitants, while their language took the place of the Akkadian, the latter becoming a dead language. Their language differed little from the Babylonian, and both retained traces of the Akkadian.

Religion.—The religion of Assyria, though essentially of Babylonian origin, was much simpler, and although polytheistic in character, was free from the multitudinous pantheon of the more ancient empire. At the head of the pantheon was the god Assur, the national deity. He was symbolically represented by a winged circle inclosing the figure of an archer. The Assyrian pantheon contained two principal triads, with numerous minor deities. A number of spirits, good and evil, presided over the minor operations of nature. There were set forms of regulating the worship of all the gods and spirits, and prayers to each were inscribed on clay tablets with blanks for the names of the persons using them. The morning and evening sacrifice, the offering of cakes, wines, milk, and honey, are found in the liturgies of the temple.

Art and Industry.—The Assyrians were far advanced in art and industry,

and in civilization. They constructed large buildings, especially palaces, of an imposing character. The palaces were raised on high terraces; there were no windows, light being obtained by carrying the walls up to a certain height and then raising on them pillars to support the roof and admit light and air. The Assyrian sculptures, as a rule, were in relief, figures in the full round being the exception. In many cases, however, as in those of winged bulls and other monsters, a compromise was attempted between the full round and relief, the heads being worked free and the body in relief, with an additional leg to meet the exigencies of different points of view. The Assyrians understood and applied the arch; constructed tunnels, aqueducts, and drains; used the pulley, the lever, and the roller; engraved gems in a highly artistic way; understood the arts of inlaying, enameling, and overlaying with metals; manufactured procelain, transparent and colored glass, and were acquainted with the lens; and possessed vases, jars, and other dishes, bronze and ivory ornaments, bells, gold earrings and bracelets of excellent design and workmanship. They had also silver ornamental work. Their household furniture also gives a high idea of their skill and taste.

Assyrian Astronomy.—The cities of Nineveh, Assur, and Arbela had each their royal observatories, superintended by astronomers-royal, who had to send in their reports to the king twice a month. At an early date the stars were numbered and named; a calendar was formed, in which the year was divided into 12 months (of 30 days each) called after the zodiacal signs, but as this division was found to be incorrect, an intercalary month was added every six years. The Assyrians employed both the dial and the clepsydra. Eclipses were recorded from a very remote epoch, and their recurrence roughly determined. The principal astronomical work, called the "Illumination of Bel," was inscribed on more than 100 tablets.

Literature and Civilization.—One of the most important results of the explorations has been the discovery in the palace of Asshur-banipal at Nineveh, of a large library consisting of many thousand tablets of baked clay inscribed with minute characters; large numbers of these are now stored in the British Museum. This library, in all probability, owes its origin to the keen political insight of Esar-haddon, but was completed by his son Asshur-banipal, whose name most of the tablets bear. Its educational character is shown by the discovery of a number of syllabaries, dictionaries, and text-books for instruction in the ancient Akkadian and Sumirian languages. There have been found also works on mathematics, tables of square and cube roots, as well as lists of plants, metals, and precious stones, animals, and birds; records of eclipses and other astral phenomena, brief lists of laws and various contract tables.

The geographical works are limited to lists of countries with their products, such as "Lebanon, cedar"; "Elam, horses"; "Cilicia, tin and silver"; and "Arabia, camels." The section most prolific in discoveries has been that of poetic and mythological literature. In 1872 the late George Smith, of the British Museum, discovered a series of poetic legends relating to the great Chaldean hero Gilgamesh (Gizdubar, or Izdubar), the 11th tablet of which contained a legend of the deluge, very closely resembling the Hebrew account.

Chronology.—The chronology of the Assyrian empire now rests upon a firm basis, being founded on several carefully prepared chronological inscriptions. The most important of these is the "Eponym Canon," a tablet containing a list of the archons, or eponyms of Nineveh, or Calah, giving an exact chronology from 913-659 B. C. As each of these officials was in office only one year, the year was named after them; and, as the date of the Bursagalu is fixed by a solar eclipse, the dates of all the officials can be ascertained.

ASTER, a genus of plants, the type of the order *asteraceæ*, or composites. It is so called because the expanded flowers resemble stars. There is but one British species, the *A. tripolium*, sea starwort, or Michaelmas daisy. In the United States these asters grow wild in the meadows and on the prairies. They grow to beautiful forms under cultivation. The popular name aster is applied to some species not of this genus. Thus the China aster is *callistephus chinensis*, and the Cape aster *agathæa amelloides*.

ASTERACEÆ (as-ter-as'ē-ī), formerly, an order, the fourth of five arranged under the alliance *compositæ*, or asterales, the others being *calyceraceæ*, *mutisiaceæ*, *cichoraceæ*, and *cynaraceæ*. These, excluding *cynaraceæ*, constitute the *compositæ* proper. The term *asteraceæ* in this sense is called also *corymbiferæ*, and comprehends the larger portion of the modern *tubulifloræ*.

Now, it is a vast order, comprising the whole of the *compositæ* proper. It includes plants like the daisy, the thistle, the dandelion, and others, possessing what, to a superficial observer, appears like a calyx, but is in reality an involucre, surrounding a receptacle on which are situated not, as might at first sight appear, numerous petals, but many florets. They are believed to constitute about one-tenth of the flowering plants. They are everywhere diffused, but in different proportions in different countries; thus they constitute one-seventh of the flowering plants of France, and half those of tropical America. The order is divided into three sub-orders: (1) *tubulifloræ;* (2) *labiatifloræ;* and (3) *ligulifloræ.* All are bitter. For more specific information regarding their qualities see the sub-orders and some of the genera.

ASTEROIDS. See PLANETOIDS.

ASTEROLEPIS, a genus of ganoid fishes named on account of the starry color of its scales.

ASTEROPHYLLITES (-fil-ī'tēz), a genus of cryptogamous plants, allied to calamites, belonging to the order *equisetaceæ.* All are fossil, and belong to the carboniferous period. Their name was given on account of the starry appearance of the verticillate foliage. Their stems were articulated and branched, and it is now known that the fossils termed *volkmannia* constituted their fructification.

ASTHMA, a chronic shortness of breath, from whatever cause it may arise. It is most common in persons possessing the nervous temperament. After some precursory symptoms, it commences, often at night, with a paroxysm in which there is a great tightness and constriction of the chest. It is produced by a morbid contraction of the bronchial muscles. There are two leading varieties of the disease, a nervous and a catarrhal, the former of pure sympathetic and symptomatic forms, and the latter latent, humeral and mucous chronic sub-varieties, besides an acute congestive, and an acute catarrhal, form.

ASTI (as'tē) (*Asta Pompeia*), a city of Piedmont, Italy, in the province of Alessandria, on the left bank of the Tanaro, 35 miles E. S. E. of Turin by rail. It has a large Gothic cathedral, which was completed about 1348, and a royal college. There is carried on a considerable trade in silk and woolen fabrics, hats, leather, and agricultural produce. *Asti spumante*, a sparkling wine, is highly esteemed. The city is of high antiquity, having been famous for its pottery before its capture by the Gauls in 400 B. C. On the occasion of its being again taken and destroyed in an irruption of the Gauls, it was rebuilt by Pompey, and received the name of Asta Pompeia. In the Middle Ages, Asti was one of the most powerful republics of upper Italy. It was captured and burned by the Emperor Frederick I. in 1155, and, after a series of vicissitudes, came into the possession of the Visconti of Naples; by them it was ceded to the French, in whose hands it remained till the middle of the 16th century, when the Dukes of Savoy acquired it. Alfieri was born here, 1749. Pop. about 45,000.

ASTOR, JOHN JACOB, an American merchant, born in Waldorf, Germany, July 17, 1763. In 1783 he came to the United States and engaged in buying furs from the Indians and selling them to dealers. His success in the fur business led him to become the owner of a number of vessels in which he shipped furs to London and brought merchandise therefrom. In furtherance of a scheme for becoming independent of the Hudson Bay Company and establishing a thoroughly American system of fur trading, he sent out expeditions to open up intercourse with the Indians on the Pacific coast, by which the present city of Astoria at the mouth of the Columbia river in Oregon was planted in 1811. An interesting outline of his projects in this connection is given in Washington Irving's "Astoria." Mr. Astor acquired large wealth, invested heavily in real estate in New York City; and at his death left a fortune estimated at $20,000,000, and the sum of $400,000, with which to found a public library in New York City. He died March 29, 1848.

ASTOR, JOHN JACOB, an American capitalist, born in Rhinebeck, N. Y., July 13, 1864; great grandson of John Jacob, graduated from Harvard University in 1888. In 1897 he built the Astoria Hotel in New York, adjoining the Waldorf Hotel, which had been built by his cousin, William Waldorf Astor, and subsequently the two were united under the name of the Waldorf-Astoria Hotel. He was appointed Colonel on the staff of Gov. Morton; was commissioned a Lieutenant-Colonel of Volunteers in May, 1898, and served on inspection and staff duty in the United States and Cuba till the surrender of Santiago. He published "A Journey

to Other Worlds"; "A Romance of the Future" (1894). Died in the wreck of the "Titanic," April 15, 1912.

ASTOR, LADY NANCY, the second woman to be elected to the British Parliament and the first woman to take actually her seat. She stood as the Conservative candidate for Plymouth in 1919 and was elected by a considerable margin over Liberal and Labor candidates. Her campaign was notable for the wit and spirit of her speeches. She is an American by birth and is the wife of Lord Waldorf Astor. She is the mother of six children. She has spoken briefly several times in Parliament on pending questions.

ASTOR, WILLIAM BACKHOUSE, an American capitalist, born in New York City, Sept. 19, 1792; eldest son of John Jacob Astor; was associated with his father in business; increased the family fortune to $45,000,000; and gave $550,000 to the Astor Library. He died in New York, Nov. 24, 1875.

ASTOR, WILLIAM WALDORF, capitalist, born in New York City, March 31, 1848; received a private education; was admitted to the bar in 1875. He was elected to the New York Assembly in 1871, and to the Senate in 1879; was defeated for Congress in 1881, and was United States Minister to Italy in 1882-1885. On the death of his father, John Jacob Astor, in 1890, he became the head of the Astor family, and inherited a fortune said to aggregate $100,000,000. He removed to England in 1890; became the owner of the "Pall Mall Gazette" and "Pall Mall Magazine"; and was naturalized a British subject on July 1, 1899. He published "Valentino" (1885) and "Sforza" (1889), both romances. He gave considerable sums to English charities and colleges and was made a peer in 1916. Died in London, Oct. 18, 1919.

ASTOR PLACE RIOT, a fatal affray which took place in New York City, May 10, 1849, in which the participants were the partisans of the actors, Edwin Forrest and William C. Macready. Twenty-two were killed and 36 wounded.

ASTORIA, a city of Oregon, the county-seat of Clatsop co., on the Columbia river, about 100 miles N. W. of Portland, and on the Spokane, Portland, and Seattle railroad. It is connected with foreign and domestic ports by several steamship lines. The city has an excellent water front, about five miles in length. It is the center of an important salmon canning industry, and has iron works, lumber mills, can factories, and other industrial establishments. A large export trade in lumber and flour is carried on. There is a custom house, postoffice, parks, library, hospitals, and other handsome public buildings. Lewis and Clarke established a fort here, and it was later the site of the fur trading station built in 1811 by John Jacob Astor. It was the first settlement in the valley of the Columbia river. Pop. (1910) 9,599; (1920) 14,027.

ASTRÆIDÆ, in zoölogy, a family of radiated animals belonging to the class *polypi* and the order *helianthoida*. It is especially to this family that the formation of coral reefs is to be attributed. It contains the genera *astræa*, *meandrina*, etc.

ASTRAGAL, in architecture, a small semi-circular molding, with a fillet beneath it, which surrounds a column in the form of a ring, separating the shaft from the capital.

ASTRAGALUS, the upper bone of the foot supporting the tibia; the huckle, ankle, or sling bone. It is a strong, irregularly-shaped bone, and is connected with the others by powerful ligaments.

ASTRAGALUS, a genus of papilionaceous plants, herbaceous or shrubby, and often spiny. *A. gummifer* yields gum tragacanth.

ASTRAKHAN (as-tra-kan'), a Russian city, capital of the government of the same name, on an elevated island in the Volga. It is the seat of a Greek archbishop and has a large cathedral, as well as places of worship for Mohammedans, Armenians, etc. The manufactures are large and increasing, and the fisheries (sturgeon, etc.) very important. It is the chief port of the Caspian, and has regular steam communication with the principal towns on its shores. Pop. about 150,000, composed of various races. The government has an area of 91,327 square miles. It consists almost entirely of two vast steppes, separated from each other by the Volga, and forming for the most part arid, sterile deserts. Pop. about 1,350,000.

ASTRAKHAN, a name given to sheepskins with a curled woolly surface obtained from a variety of sheep found in Bokhara, Persia, and Syria; also a rough fabric with a pile in imitation of this.

ASTRINGENTS, substances which produce contraction and condensation of the muscular fiber: for instance, when



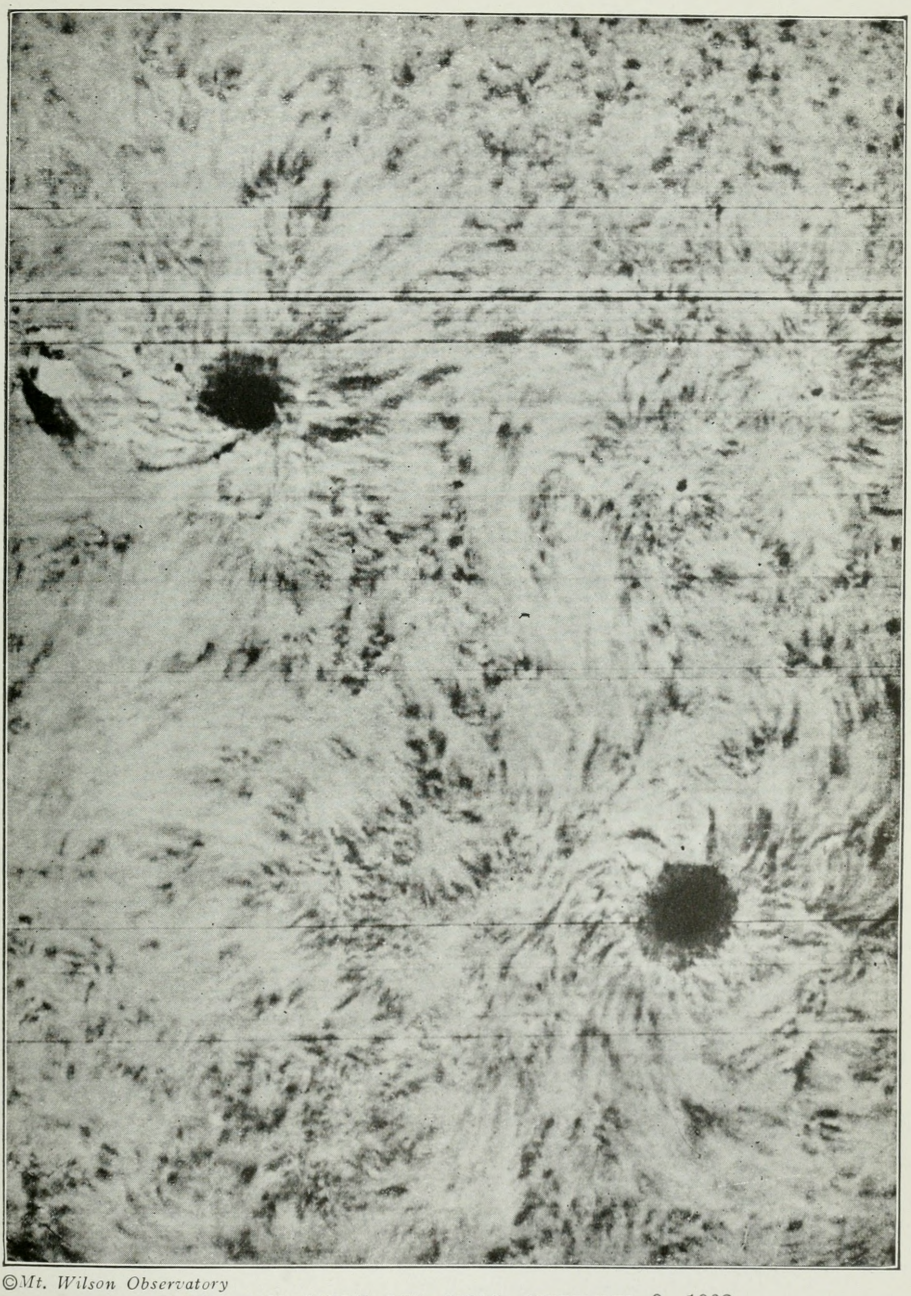
Mt. Wilson Observatory

MT. WILSON OBSERVATORY, MT. WILSON, CALIFORNIA. THE 100-FOOT DOME, VIEWED FROM THE 150-FOOT TOWER



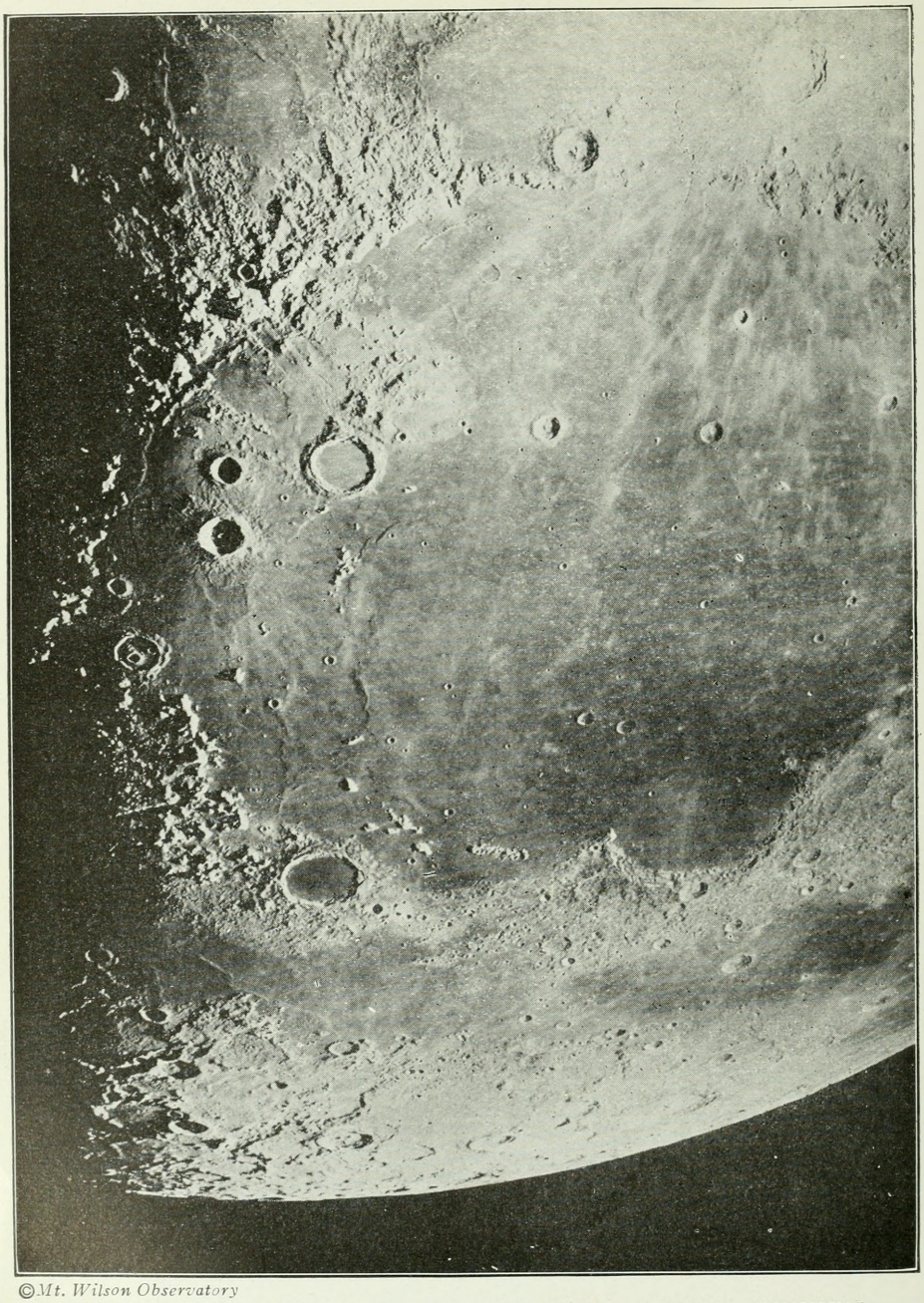
©International Film Service

THE ARC DESCRIBED BY THE SUN ABOVE THE HORIZON AT NOME, ALASKA, ON THE SHORTEST DAY OF THE YEAR, DECEMBER 23, 1919. THE FIRST EXPOSURE WAS MADE AT SUNRISE, 10 A. M., AND THE LAST AT SUNSET, 2 P. M. THE OTHER EXPOSURES WERE MADE AT HALF-HOUR INTERVALS DURING THE DAY



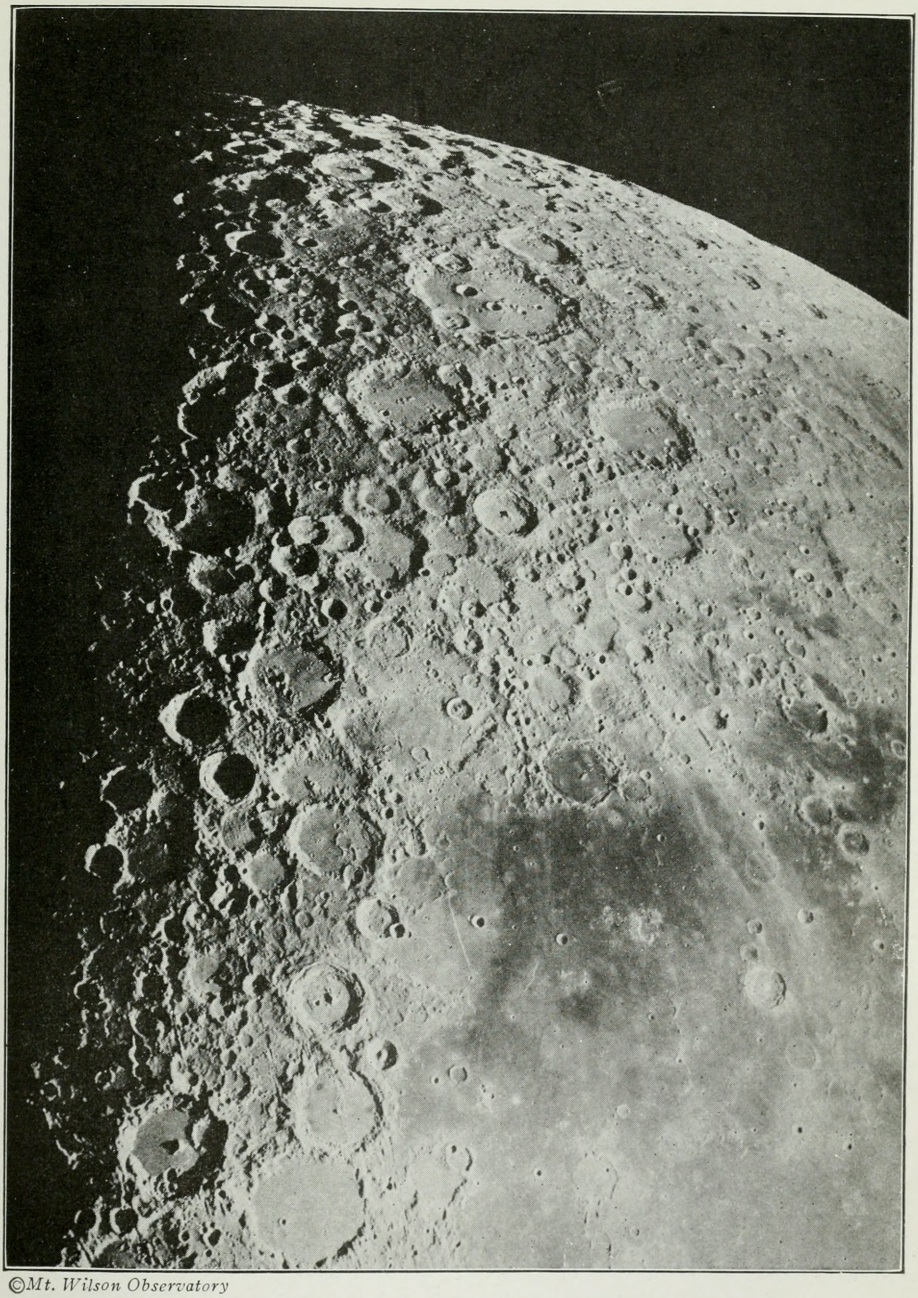
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NORTH AND SOUTH SUN SPOTS, SEPTEMBER 9, 1908



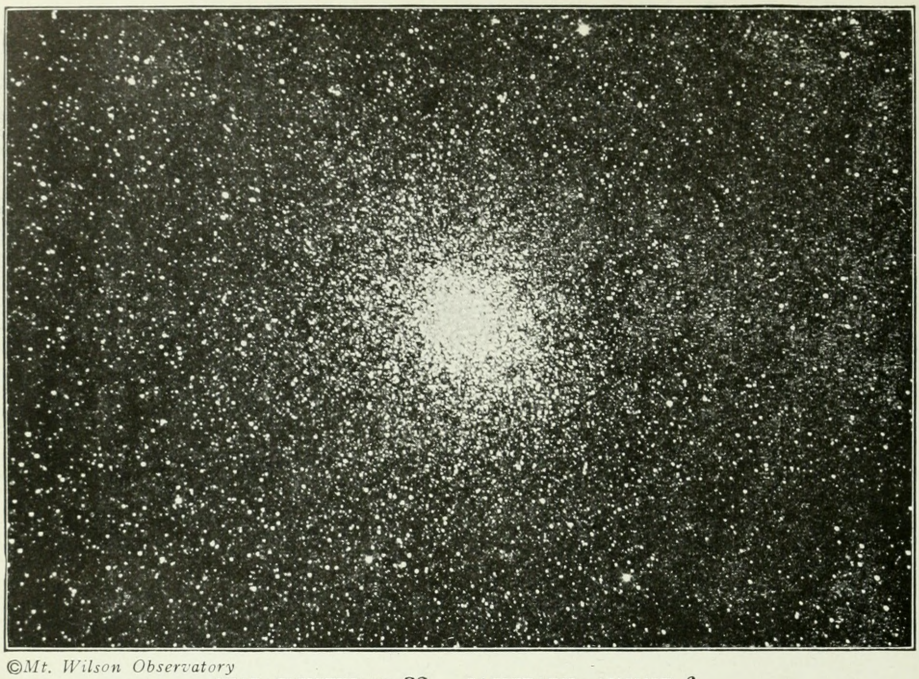
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NORTHERN PART OF THE MOON, AT LAST QUARTER. NIGHT IS ADVANCING FROM THE LEFT. THE DARK OVAL PLAIN, SURROUNDED BY A BRIGHT WALL, IS "PLATO." THE MOUNTAINS ABOVE AND TO THE LEFT OF "PLATO" ARE THE "LUNAR ALPS." THE LONGER RANGE, EXTENDING ACROSS THE UPPER LEFT-HAND PART OF THE VIEW, ARE THE "LUNAR APENNINES"



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SOUTHERN PART OF THE MOON, AT LAST QUARTER. NIGHT ADVANCES FROM THE LEFT. THE BROKEN ROW OF YAWNING BLACK HOLES ALONG THE TERMINATOR BETWEEN DAY AND NIGHT INCLUDE, TOGETHER WITH THE SECOND ROW TO THE RIGHT, WHOSE BOTTOMS ARE STILL IN THE SUNLIGHT, THE GRANDEST "RING PLAINS" AND "CRATER MOUNTAINS" ON THE MOON. THE LARGE SMOOTH ONE AT THE BOTTOM IS "PTOLEMAEUS"



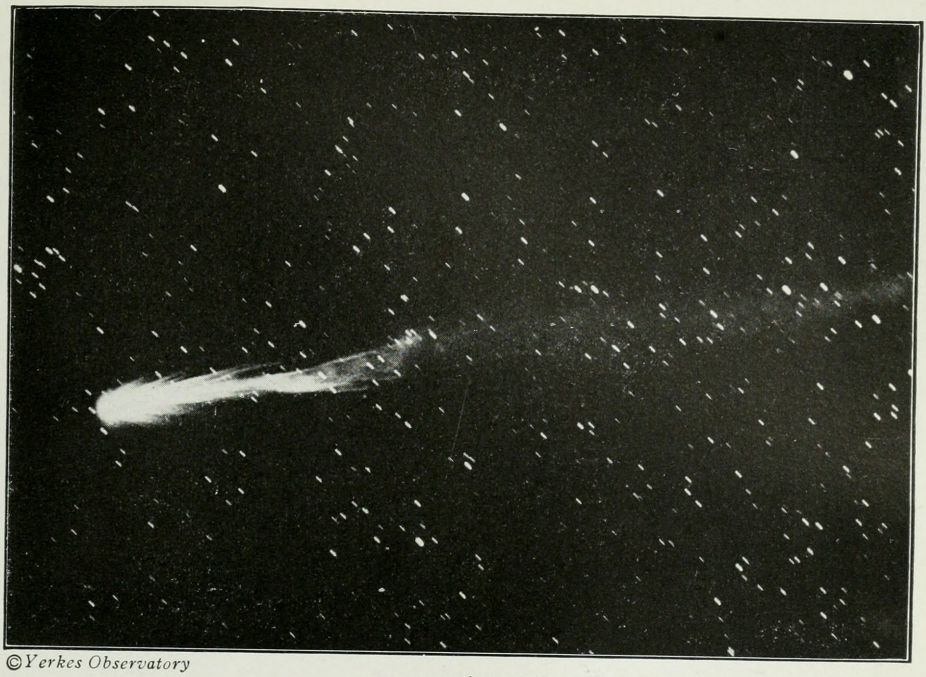
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STAR CLUSTER M 22. SAGITTARII, AUGUST 6



©*Mt. Wilson Observatory*

IRREGULAR NEBULA M 17. SAGITTARII (OMEGA), JULY 29, 1919



©*Yerkes Observatory*

MOREHOUSE'S COMET



©*Mt. Wilson Observatory*

THE PLANET SATURN



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TRANSMITTING CLOCKS FOR TIME SIGNALS, NAVAL OBSERVATORY, WASHINGTON, D. C.

applied to a bleeding wound they so contract the tissues as to stop the hemorrhage. The contraction thus produced is different from that effected by an ordinary stimulant, and from that caused by the administration of a tonic.

ASTROLABE, in its etymological sense, any instrument for taking the altitude of a star or other heavenly body, a definition which would include not merely the astrolabe, properly so called, but also the sextant, the quadrant, the equatorial, the altitude and the azimuth circle, the theodolite, or any similar instrument.

A type of astrolabe was in use among astronomers at least from the early part of the 2d century A. D., if not even from the 2d or 3d century B. C.

ASTROLOGY, originally a discourse concerning the stars; subsequently the true science of astronomy; now the pseudo science which pretends to foretell future events by studying the position of the stars, and ascertaining their alleged influence upon human destiny. Natural astrology professes to predict changes in the weather from studying the stars and judicial or judiciary astrology to foretell events bearing on the destiny of individual human beings or the race of mankind generally.

The Chinese, the Egyptians, the Chaldeans, the Romans, and most other ancient nations, with the honorable exception of the Greeks, became implicit believers in astrology. It was partly the cause and partly the effect of the prevalent worship of the heavenly bodies. The later Jews, the Arabs, with other Mohammedan races, and the Christians in medieval Europe, were all great cultivators of astrology. The ordinary method of procedure in the Middle Ages was to divide a globe or a planisphere into 12 portions by circles running from pole to pole, like those which now mark meridians of longitude. Each of the 12 spaces or intervals between these circles was called a "house" of heaven. The sun, the moon, and the stars all pass once in 24 hours through the portion of heavens represented by the 12 "houses"; nowhere, however, except at the equator, are the same stars uniformly together in the same house. Every house has one of the heavenly bodies ruling over it as its lord.

The houses symbolize different advantages or disadvantages. The first is the house of life; the second, of riches; the third, of brethren; the fourth, of parents; the fifth, of children; the sixth, of health; the seventh, of marriage; the eighth, of death; the ninth, of religion; the tenth, of dignities; the eleventh, of friends; and the twelfth, of enemies. The houses vary in strength, the first one, that containing the part of the heavens about to rise, being the most powerful of all; it is called the ascendant, while the point of the ecliptic just rising is termed the horoscope. The important matter was to ascertain what house and star was in the ascendant at the moment of a person's birth, from which it was deemed possible to augur his fortune. Astrology still flourishes in Asia and Africa.

ASTRONOMY, the science that treats of all the heavenly bodies, including the earth, as related to them. It is the oldest of the sciences, and the mother of those generally called exact mathematics, geodesy and physics.

Astronomy may to-day be broadly divided into two branches, mathematical and physical, and these are almost synonymous with two terms recently introduced, the old and the new astronomy, as defined by the statement that the old tells us where the heavenly bodies are, the new, what they are. The characteristic feature of the instruments and methods of the new versus the old astronomy is that the new deals with some special form of radiant energy, measuring or analyzing the vibrations transmitted throughout all space by means of the elastic medium called ether.

Under the two broad divisions stated above, mathematical astronomy would include the following divisions, which are not, however, mutually exclusive: Spherical astronomy, which treats of angles and directions on the celestial sphere; practical astronomy, treating of the instruments, methods of observation, and of calculation employed to get at the facts and data of astronomy; theoretical astronomy, which deals with the orbits, tables and ephemerides of the sun, moon, planets, and comets, including the effect of their mutual attractions, and gravitational or mechanical astronomy, which treats of the forces (principally gravitation) at work in space and the motions resulting therefrom. This last was formerly called physical astronomy, but the name has been monopolized by the new astronomy within the last few decades, and must now be reserved for it. This second branch, likewise called astronomical physics and astro-physics, attempts to answer the question of what the heavenly bodies are, the nature and constitution of their interiors, surfaces, atmosphere, their temperatures and radi-

ations, and the effect of these radiations upon other bodies, and all allied questions arising out of these. Its principal instrument, the spectroscope, has likewise furnished data otherwise unattainable in the field of mathematical astronomy, viz., the determination of the motion to or from us of the heavenly bodies by displacement of the lines of their spectra due to this motion.

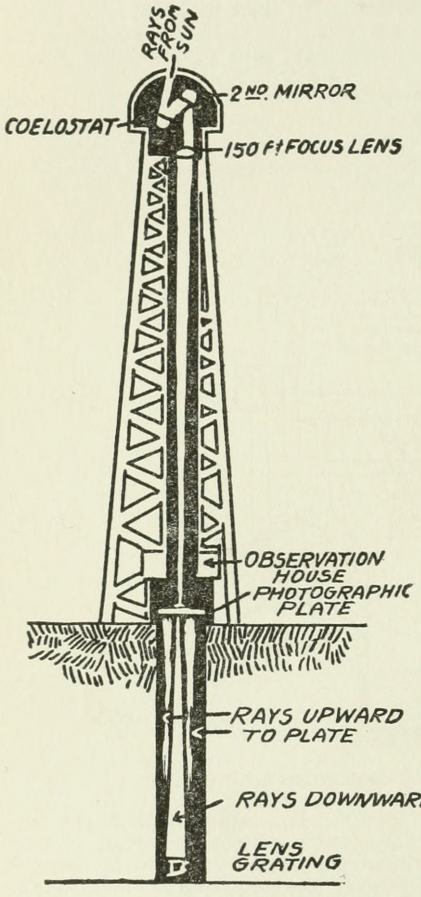


DIAGRAM OF COELOSTAT OF MT. WILSON OBSERVATORY. THE TOWER IS 164′ HIGH

History.—The Chinese, Hindus, Chaldeans, Egyptians, and Greeks investigated the heavens long before the Christian era. In China, astronomy was intimately associated with state politics; the Indians, Chaldeans, and Egyptians made it a matter of religion. The Greek historians attribute the earliest knowledge of astronomical science to the Chaldeans and Egyptians. They say that the former discovered the Saros or cycle of 223 lunations, nearly equal to 18 years, by which they predicted the return of previously observed eclipses and made use of other empirical cycles or periods.

Thales (640 B. C.), the founder of the Ionic school, laid the foundation of Greek astronomy. The successors of Thales held opinions which, in many respects, are wonderfully in accordance with modern ideas. Anaximander, it is said, held that the earth moved about its own axis, and that the moon's light was reflected from the sun. To him is also attributed the belief in the plurality of worlds.

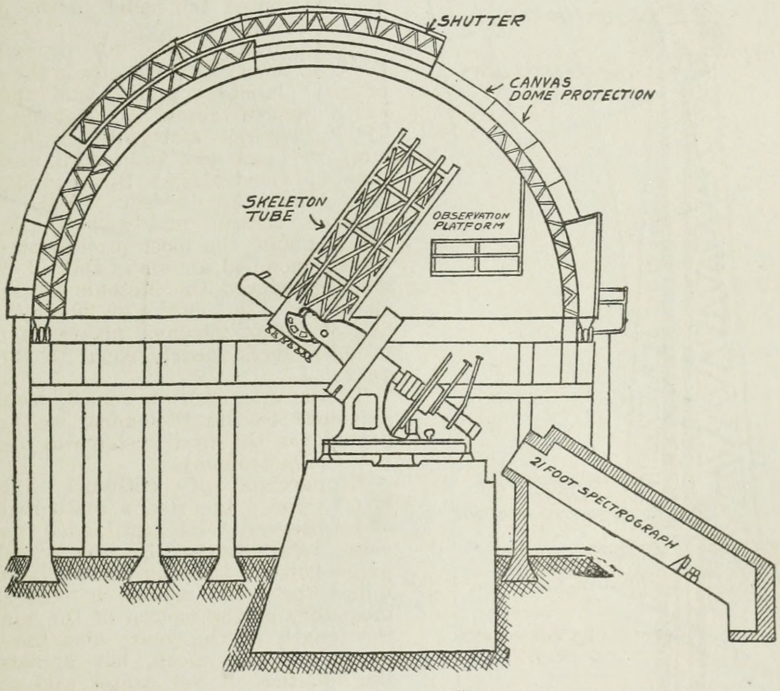
Pythagoras (500 B. C.) promulgated the true theory that the sun is the center of the planetary world, and that the earth revolves round it. But the views of Pythagoras met with little or no support from his successors until the time of Copernicus. Between Pythagoras and the advent of the Alexandrian school, nearly two centuries later, among the most prominent names in astronomical annals is that of Meton, who introduced the Metonic Cycle, consisting of 125 months of 30 days each, and of 100 of 29 days, making a period of 6,940 days, nearly equal to 19 solar years.

To the Alexandrian school, owing its existence to the Ptolemies, we are indebted for the first systematic observations in astronomy.

Hipparchus of Bithynia (160-125 B. C.), was a theorist, a mathematician, and observer. He catalogued no less than 1,081 stars. He discovered the precession of the equinoxes; he determined the mean motion as well as the inequality of the motion of the sun, and the length of the year; also the mean motion of the moon, her eccentricity, the equation of her center and the inclination of her orbit; and he suspected the inequality afterward found by Ptolemy (the evection). After the death of Hipparchus, astronomy languished for nearly three centuries.

Ptolemy (130-150 A. D.), besides being a practical astronomer, was accomplished as a musician, a geographer, and a mathematician. His most important discovery in astronomy was the evection of the moon. He also was the first to point out the effect of refraction. He was the founder of the false system known by his name, and which was universally accepted as the true theory of the universe until the researches of Copernicus exploded it. The Ptolemaic system placed the earth, immovable, in the center of the universe, making the entire heavens revolve round it in the

course of 24 hours. The work by which he is best known, however, is the collection and systematic arrangement of the ancient observations in his great work, the "Megale Syntaxis," which gives a complete résumé of the astronomical knowledge of the day. The most important part of it is the seventh and eighth books, which contain the catalogue of stars which bears Ptolemy's name, though it is only a compilation of the catalogue of Hipparchus with the positions brought up to the time of Ptolemy. These latter are in use to-day, though the gaps between them have been filled up in some cases by more modern asterisms.



THE DOME AND MOUNTING FOR A 60″ REFLECTING TELESCOPE

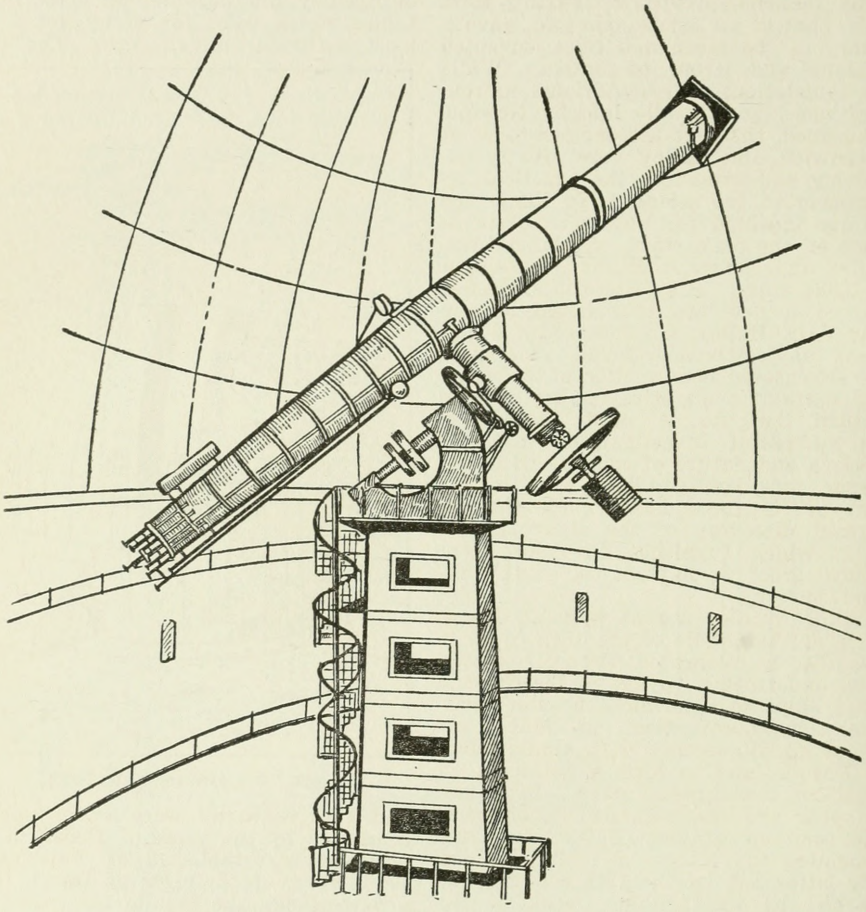
To the Arabs we owe the next advances in astronomy. The most illustrious of the Arabian school were Albategnus, or Al Batani (880 A. D.), who discovered the motion of the solar apogee, and who was the first to make use of sines and versed sines instead of chords; and Ibn-Yunis (1000 A. D.), an excellent mathematician, who made observations of great importance in determining the disturbances and eccentricities of Jupiter and Saturn, and who was the first to use cotangents and sectants. Likewise, at about the same time, Abul Wefa discovered the third inequality in the moon's motion, the variation, and determined its amount.

The revival of astronomy in Europe may be said to have begun with George Purbach, who translated the "Almagest" at Vienna. His pupil, John Muller, translated into Latin the works of Ptolemy and the conics of Appolonius, built an observatory at Nuremberg, and equipped it with instruments of his own invention. He died in 1476.

Copernicus (1473-1543) exploded the Ptolemaic idea, and promulgated a correct theory. It makes the sun the immovable center of the universe, around which all the planets revolve in concentric orbits, Mercury and Venus within the earth's orbit, and all other planets without it.

Decidedly the most industrious observer and eminent practical astronomer from the time of the Arabs to the latter half of the 16th century was Tycho Brahe (1546-1601). He made the first table of refractions, and discovered the variation and annual equation of the moon, the inequalities of the motion of the nodes, and of the inclination of the lunar orbit. He also demonstrated that the region of the comets is far beyond the orbit of the moon, and he determined the positions of 777 stars with

an accuracy far surpassing anything before done in that line. He left behind him a mass of observations of the sun and planets which he had made to demonstrate the truth of his system of the universe, but which afterward became, in Kepler's hands, the means of its overthrow and the final and permanent establishment of the truth of the Copernican system. Kepler's brilliant discovery of the three laws of planetary motion made his name immortal.



THE 40″ REFRACTOR TELESCOPE AT YERKES OBSERVATORY

Galileo Galilei was the contemporary of Kepler, and, as his discoveries were of a more popular character, he obtained a more immediate fame and reputation. In the interval between the great discoveries of Kepler and Galileo and those of Newton various astronomers made valuable additions to astronomical knowledge or invented new apparatus for observing the heavenly bodies. Perhaps the greatest of these was the invention of logarithms by Lord Napier. In 1603, John Bayer, of Augsburg, published his "Uranometria," or maps of the 48 constellations which had been handed down from Hipparchus through Ptolemy in the "Almagest," and, on these maps, he for the first time assigned to the individual stars the letters that are used to-day. The researches of Descartes gave a new help to mathematical analysis. Horrox observed the transit of Venus in 1639, the first ever seen by man.

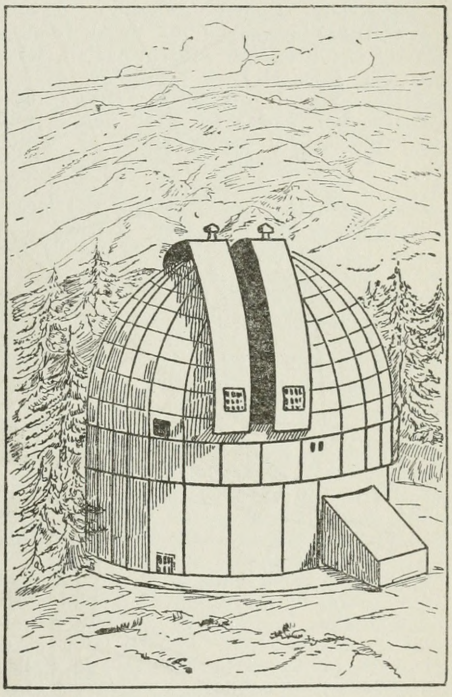
The most accurate determinations of the positions of the heavenly bodies made without the help of the telescope were those of Hevelius, a rich citizen of Danzig. The catalogue of stars which bears his name, and by whose numbers in the different constellations the individual stars are still called to-day with

the distinguishing letter "H," is the greatest of the results of his labors.

Newton's fame rests on his discovery of the law of gravitation, announced in the "Principia" in 1677. Newton also made the important discovery of the revolution of comets around the sun in conic sections, proved the earth's form to be that of an oblate spheroid, gave a theory of the moon and tides, invented fluxions and wrote on optics. While the foundations of gravitational astronomy were thus broadly laid by Newton, Flamsteed, the first astronomer-royal at Greenwich, and Halley were greatly improving and extending the practical department of the science. To Flamsteed we are indebted for numerous observations on the fixed stars, on planets, satellites and comets, and for a catalogue of 2,884 stars. His "Historia Cœlestis" formed a new era in sidereal astronomy. Dr. Halley, who succeeded Flamsteed as astronomer-royal, discovered the accelerated mean motion of the moon, and certain inequalities in Jupiter and Saturn, but he is most famed for his successful investigations into the motions and nature of comets. His successor was Dr. Bradley, who, in the year of Newton's death, made the important discovery of the aberration of light, which furnishes the most conclusive proof we have of the earth's annual motion.

While Bradley was at work at Greenwich, at the middle of the 18th century, Lacaille, a celebrated French astronomer, undertook a voyage to the Cape of Good Hope to determine the sun's parallax, by observations of Mars and Venus simultaneously with similar ones in Europe, and to form a catalogue of southern circumpolar stars. In a single year and single-handed he observed the positions of over 10,000 stars and computed the places of 1,942 of them. The latter half of the 18th century was marked by the brilliant work of Sir William Herschel, who discovered the planet Uranus and its four satellites, and two additional satellites of Saturn; determined the direction of the motion of the solar system in space; resolved the Milky Way into countless myriads of stars, and opened up a boundless field of discovery and research among the nebulæ and double and multiple stars.

Maskelyne perfected the method of reducing observations of lunar distances at sea for the determination of longitudes, and had tables of lunar distances first published in the British "Nautical Almanac." Lalande observed the positions of by far the largest number of stars that had been catalogued up to the end of the 18th century. These were afterward reduced and published by Baily in a catalogue which contains over 47,000 star positions. Mayer, besides making a valuable catalogue of zodiacal stars at about the same time as those of Bradley and Lacaille, perfected lunar tables which were for many years the most accurate in existence. The 18th



MT. WILSON OBSERVATORY

and 19th centuries were astronomically connected by the work of Piazzi in the observatory established at Palermo in 1790, where on the night of Jan. 1, 1801, a new planet, the first of the numerous belt of planetoids between Mars and Jupiter, was discovered.

Modern Astronomy.—Friedrich Wilhelm Bessel contributed more than any other to the solid advancement of the science in the 19th century. Bessel combined in an extraordinary degree the qualities of an able mathematician and a skillful observer. Before mentioning particularly any of the other prominent astronomers of the early part of the 19th century, the celebrated optician Fraunhofer, who contributed so much to their success, deserves special notice. In connection with his experiments on light for the further perfection of his lenses, Fraunhofer was led to the discovery of

the host of lines of the solar spectrum, of which he counted 600 and mapped 324, and which are to-day known as the "Fraunhofer Lines." Though he did not have the time to carry this discovery to its legitimate conclusion, this being afterward done by Kirchhoff and Bunsen, Fraunhofer's labors may be considered as the beginning of the new astronomy.

Friedrich Georg Wilhelm Struve (1793-1864) rendered his name immortal by the accurate determination, with the 9½ inch Dorpat refractor, of the position-angles, distances, colors and relative brightness of 3,112 double and multiple stars, about 2,200 of which were new discoveries. Friedrich Wilhelm August Argelander (1799-1875) ranks next to Bessel among the great astronomers of the 19th century. A pupil of the latter, he thoroughly imbibed the ideas of exactitude in astronomical observations for which his great master was pre-eminent, and he carried them out in all his subsequent work. His first work was the observations, made while his observatory at Bonn was being completed, for the formation of the "Uranometria Nova," the accepted standard of stellar magnitudes.

John F. W. Herschel (1792-1871), following in the footsteps of his father, in 1834 began at the Cape of Good Hope a survey of the southern heavens, using an 18-inch reflector of his own construction. With this, in the course of four years, he accumulated a vast store of material, in the way of new double and multiple stars, nebulæ and star-clusters, photometric measures of stellar brightness, "soundings" or "star-gauges" in the Milky Way, to show the laws of the distribution of the stars in space, all of which form the starting point of our knowledge of the southern heavens. The work of Sir George Biddell Airy (1801-1892) next deserves attention. Appointed in 1835 to the directorship of the Royal Observatory of Greenwich, he first carried to completion the great work begun at his suggestion two years before—the complete reduction, on a uniform system, of all the Greenwich planetary observations from 1750 onward.

The greatest event of the century was the discovery of the planet Neptune. The work of Lagrange and Laplace in the domain of gravitational astronomy was continued and vastly extended in the 19th century by several eminent mathematicians, astronomers, notably by Leverrier. His life was devoted to the perfection of the theory of the planetary motions. Adams, the equal sharer with him in the glory of the discovery of Neptune, has also made very important additions to our knowledge in the same field, and in the United States we have, in the persons of Simon Newcombe and George W. Hill, their worthy successors and collaborators. The amount of work which Newcomb published in the line of fundamental star places, the discussion of old eclipses and occultations, with their bearing on the theory of the moon's motion, the motion of Mercury, etc., was prodigious.

The theory of the moon's motion, or the lunar theory, as it is generally called, has from the beginning attracted the attention of the ablest mathematical investigators. The two who stand out prominently before all others are Hansen and Delaunay. In various other branches of gravitational astronomy, several names deserve special mention. Olbers, besides being the discoverer of several comets and of the second and fourth planetoid, is best known for his development of the best method of computing cometary orbits. Encke, a pupil of Gauss, developed the best methods of applying the method of least squares to computation, determined a value of the solar parallax, which stood a long time as giving the accepted value of 95,000,000 miles as the distance of the sun, but is best known for the discovery of the remarkably short period of the comet which bears his name.

Hall's detection of the two minute and remarkable satellites of Mars ranks next to that of Neptune as the most brilliant of the century. It was not an accidental picking up of easily visible object in sweeps, but the result of a well planned and careful search at the most favorable time, the opposition of 1877, after the erection of the 26-inch refractor of the United States Naval Observatory. Hall also kept up systematically the observation of the difficult satellite systems of Saturn, Uranus, and Neptune after taking charge of the 26-inch Washington refractor. Next came the discovery of the fifth satellite of Jupiter, by Prof. Edward E. Barnard, of the Lick Observatory, Sept. 9, 1892. This was followed by the discovery, March 18, 1899, of the ninth satellite of Saturn, by Prof. William H. Pickering, of the Harvard Observatory.

The work done at Cordoba, in the Argentine Republic, by Dr. Benjamin Apthorp Gould and his assistants in 1870, must next be mentioned. Dr. Gould began the observation for a uranometry of the southern heavens, to include all stars down to the seventh magnitude. This great work contains the names,

positions, magnitudes, to the nearest 10th, or 7,730 stars situated between —10° and the South Pole, and the magnitudes, to the nearest quarter, of more than 1,000 others, mostly companions of these, or situated in clusters, the joint light of which equaled a seventh magnitude star.

The New Astronomy.—The spectroscope has been the principal instrument of investigation in the new astronomy. After the work of Kirchhoff and Bunsen, the next important step was the investigation, with the diffraction spectroscope, by Angstrom and Thalen, of the formation of the so-called normal spectrum, in which the distances of the lines are proportional to their wave-lengths. The map of the solar spectrum constructed in this way has been the standard for the wave-lengths of the Fraunhofer line until within a very few years. The work of Rowland at the Johns Hopkins University, photographing directly the spectrum formed from his concave mirror-gratings (partly invented by him), has so far exceeded the Angstrom maps that the latter may now be considered displaced. The phenomena attending the solar eclipses and of comets offered a new field for the spectroscope, and in this a host of names at once claim attention, principal among which are those of Young, Hale, director of Yerkes, Keeler of Lick's, Vogel, Secchi, Huggins, Lockyer, Janssen, and Langley.

The simultaneous and independent discoveries by Lockyer and Janssen in connection with the Indian solar eclipse of August, 1868 (that the solar prominences, or hydrogen clouds surrounding the sun, can be studied at any time without the help of an eclipse), revolutionized the methods of studying that part of the sun's surroundings.

Photometry, or the measurement of the brightness of the different heavenly bodies, so far as its results are concerned, is properly classed under the new astronomy. It has, however, been employed from the earliest times, without instrumental assistance, in classifying the stars into a scale of magnitudes, and in later days in observation of the changes in the light of the variable stars.

Solar Investigations.—Sir John Herschel and Pouillet were the first to measure the amount of heat which we receive from the sun by noting the increase in the temperature of a given amount of water upon which a given beam of sunlight is allowed to fall for a certain time. Using various forms of equivalent apparatus, Waterston, Ericsson, Secchi, Crova, Violle, Langley, and others have made different determinations of the so-called "solar-constant," or the amount of radiant energy which falls upon a square meter of surface at the upper limits of the atmosphere.

The most remarkable work of all in the domain of radiant energy has been that of Langley with his bolometer. By means of this instrument minute amounts of such radiations, which were entirely beyond the reach of all previous experiments, can be detected and accurately measured.

Further Progress. — In summarizing the growth of astronomy during the 19th century we enumerate the researches of Henderson, Winnecke, Brunnow, Gill, and Elkin in stellar parallax; the double-star discoveries and measures of Struve (Otto), Dawes, Dembowski, Burnham, and Stone; the discoveries of comets by Pons, Tuttle, Tempel, Swift, Brooks, Barnard, and many others; the discovery and cataloguing of nebulæ by Herschel, Lassel, Tempel, Swift, Stone, and Dreyer; the elaborate work of Carrington on sun spots and the positions of northern circumpolar stars; the charting of faint ecliptic stars by Chacornac, the Henry brothers, and especially Peters; Chandler's important work in variable stars and in variation of latitude; the work of Schmidt on various stars and in selenography; the discovery of difficult planetary satellites by Lassel and Bond; the spectroscopic researches of Young, Schuster, Draper, Thollon, and Lohse; the determinations of the velocity of light by Fizeau, Foucault, Michelson, and Newcomb; Gill's work upon the parallax of Mars and some of the asteroids; Elkin's thorough remeasurement of the position of the stars of the Pleiades with the heliometer; Darwin's investigation of the entirely new subject of the bearing of tidal friction upon the development of planetary and satellite systems and Stone's observations at the Cape, resulting in the formation of the "Cape Catalogue," which ranks next to the work of Gould in furnishing us exact positions of the stars of the southern heavens. Harkness' work upon the reduction of the American observations of the transit of Venus should also be noted.

Instruments.—The history of the progress of astronomy in the 19th century would be incomplete without a mention of the remarkable opticians and mechanicians whose handiwork has made it possible. We have already mentioned Fraunhofer. Pre-eminent among them all are the names of the late Alvan Clark, of Cambridge, Mass., and his sons,

George B. and Alvan G. Their latest masterpieces are the huge 36-inch objective of the Lick telescope, and that of the Yerkes instrument.

In the matter of the polishing of optical surfaces, the figuring of lenses, and the ruling of gratings, American artisans have excelled all others from their first attempts. Only in the production of instruments of precision and in the making of optical glass do they still yield superiority to European artisans.

Celestial Photography.—As early as 1840 Dr. John W. Draper, of New York, obtained a few photographs of the moon about an inch in diameter. In 1845, at Cambridge, Mass., Bond obtained photographic impressions of Vega and Castor, and in 1850 obtained the picture of the moon.

Among the successes of photography as an adjunct to the new astronomy have been photographs of stellar spectra by Pickering at the Harvard University Observatory, and the photographic normal spectrum of the sun recently completed by Rowland at the Johns Hopkins University.

The Mount Wilson (Cal.) Solar Observatory of the Carnegie Institute (1904), designed for spectroscopic study of the sun and stars, has produced marvelous photographs of these bodies that have proved invaluable to astronomers.

ASTROPHYSICS, that branch of astronomy which deals with the physical condition, temperature, and chemical properties of the celestial bodies. The chief instruments employed are the spectroscope, the bolometer, the photometer, and the camera. The most important of these is the SPECTROSCOPE (*q. v.*).

ASTURIAS (as-tö'rē-az), or **OVIEDO**, a northern province of Spain, washed on the N. by the Bay of Biscay; area 4,207 square miles; pop. about 700,000. The low hills of Leon and Old Castile rise gradually to the mountain-chain which forms the S. boundary, and which is but a prolongation of the Pyrenean system. The N. slopes are broken by steep and dark valleys or chasms, which are among the wildest and most picturesque in Spain. The chief rivers are the Nalon, Navia, and Sella. Agriculture is the chief industry. The coasts have good fisheries, but poor harbors. The chief minerals of the province are copper, iron, lead, cobalt, arsenic, antimony, and coal of excellent quality. The chief towns are Gijon, Aviles, Llanes, and Luarca. Oviedo, the capital, has, since 1833, given its name to the whole province. The heir-apparent of the Spanish King has the title of Prince or Princess of Asturias. The Romans had great difficulty in subduing Asturias, about 22 B. C. Later it offered an asylum to the Goths, whose prince, Pelayo, bravely withstood the Arabs (718 A. D.); his successors carried on the contest successfully, and became Kings of Leon in the 10th century.

ASTYAGES (as-tī'a-jēz), son of Cyaxares, the last King of Media, reigned 594-559 B. C. In the latter year he was dethroned by Cyrus, who, according to Herodotus, was his grandson.

ASUNCION (as-ön'shōn), or **ASSUMPTION**, the capital of the Republic of Paraguay; on a terrace skirting the left bank of the Paraguay river. It has a cathedral (1845) and a college. The principal articles of commerce are leather, tobacco, sugar, manioc, and maté or Paraguay tea. It was founded on Aug. 15, 1537, the feast of the Assumption. Pop. about 120,000.

ATACAMA (at-a-kä'ma), the name, formerly, of two provinces, (1) Chilean and (2) Bolivian; now entirely belonging to Chile. Area 30,728 square miles; pop. about 70,000.

The Saline of Atacama is a salt morass, mostly dried up, 1,074 square miles in extent, on an elevation of 7,000 feet. The province is very rich in minerals, especially copper and silver.

ATACAMITE, an orthorhombic, translucent mineral, classed by Prof. Dana under his oxychlorids. The hardness is 3 to 3.5; the sp. gr., 3.7 to 4.3; the luster verging from adamantine to vitreous; the color bright green, with an apple-green streak. It is massive or pulverulent. Composition: Chlorine, 15.51 to 16.33; oxide of copper, 50 to 66.25; copper, 13.33 to 56.46; water, 16.91 to 22.60. It occurs in Atacama, in Chile; in Australia; in Africa; in Spain; and at St. Just, in Cornwall.

ATAHUALPA (at-a-whal'pa), the last Inca of Peru, was the son of the 11th Inca, Manco Capac. His mother was of royal lineage, and through her he inherited the kingdom of Quito. With his elder brother Huascar, who succeeded to the throne of the Incas in 1523, he remained at peace for five years; but, on his being summoned to acknowledge the dependency of his kingdom on that of Peru, he prepared for war, entered the dominions of Huascar with 30,000 men, defeated him in a pitched battle, and thrust him into prison. Three years afterward, Pizarro captured the island of Puna, and Huascar, hearing in prison

of the victorious stranger, sent ambassadors to Puna requesting assistance. The inca also proposed an interview with the Spaniard, and Pizarro by treachery succeeded in obtaining possession of the person of the Inca. Huascar had been put to death by order of his brother, and now Atahualpa was declared guilty of treason to the Spanish crown, and sentenced to be burned alive, in 1533. The sentence was commuted to strangulation.

ATALANTA, the daughter of Jason and Clymene, celebrated for her skill in archery, was a native of Arcadia. She slew the Centaurs, Rhœcus and Hylæus; sailed to Colchis with the Argonauts, and was afterward present at the chase of the Calydonian boar, which she was the first to wound. Another Atalanta, daughter of Schœneus, King of Scyros, was renowned for her beauty, and swiftness in running. She required each of her lovers to run a race with her. Her admirer was to run before, unarmed, while she followed him with a dart. If she could not overtake him, she was his own; but if he were outrun, he was doomed to death, his head to be set up at the goal. Many had fallen victims in the attempt, when Hippomenes, the son of Mægareus, by the aid of Venus, overcame her. The goddess gave him three golden apples, which he threw behind him, one after the other, as he ran. Atalanta stopped to pick them up, and Hippomenes reached the goal before her. Her former reserve now gave place to such ungovernable passion that the chaste Ceres, becoming offended, changed both the parties into lions, and compelled them from that time to draw her chariot.

ATAVISM, in biology, the tendency to reproduce the ancestral type in animals or plants which have become considerably modified by breeding or cultivation; the reversion of a descendant to some peculiarity of a more or less remote ancestor.

ATBARA (at-bar'a), the most northerly tributary of the Nile. It rises in the Abyssinian highlands, receives several large tributaries, and enters the Nile about 18° N.

ATCHAFALAYA (ach-a-fal-ā'a), ("Lost Water"), a river of the United States, an outlet of the Red river, which strikes off before the junction of that river with the Mississippi, flows southward, and enters the Gulf of Mexico by Atchafalaya Bay. Its length is 250 miles.

ATCHEEN (also ACHEEN or ATCHIN; called by the Dutch ATJEH), until 1873 an independent state in the N. W. part of Sumatra, now a province of the Dutch Indies, with an area of 20,471 square miles; pop. about 800,000. The surface is divided into an eastern and a western half by the mountain chain which traverses the whole island, and which rises in Abong-Abong to 11,000 feet. The flora and fauna agree with those of Sumatra; pepper and areca nuts are produced in Atcheen. The natives employ themselves in agriculture, cattle rearing, trade, fisheries, weaving cloth, and working in gold, silver, and iron. In appearance, dress, character, and manners they are distinct from the rest of the inhabitants of Sumatra. Of darker color and lower stature than the latter, they are also more active and industrious, good seamen and soldiers; but they are treacherous, revengeful, bloodthirsty, immoral and inordinately addicted to opium. The capital of the government is Kota Radja or Atcheen, in the northwestern extremity, situated on a stream navigable by boats. It contains a Dutch garrison of several thousand men.

During the earlier half of the 17th century Atcheen was a powerful sultanate, with supremacy over several islands and a part of the Malay Peninsula. Its power gradually declined; but an attempt was made by the treaty between the English and the Dutch, in 1824, to reserve its independence. The inevitable war, however, broke out in 1873, and ended as inevitably, though not without a desperate resistance, in the conquest and annexation of the sultanate.

ATCHISON, city and county-seat of Atchison co., Kan.; on the Missouri river and the Atchison, Topeka and Santa Fé, the Burlington, the Chicago, Rock Island and Pacific, and the Missouri Pacific railroads; 25 miles N. by N. W. of Leavenworth. The city is an important commercial center, by reason of its excellent river and extensive railroad facilities. It exports largely grain, flour, live stock, and dressed meats, and has many important manufacturing establishments. There are gas, electric light, sewer, water and electric railway plants; several public parks; a noteworthy bridge across the Missouri river; an attractive Union depôt; National banks; and daily, weekly and monthly periodicals. Atchison is the seat of the State Soldiers' Orphans' Home, of Midland College (Lutheran) and St. Benedict's College (Roman Catholic), and has a public library, public high and graded schools, and a number of high graded private schools. **Pop. (1910) 16,429; (1920) 12,630.**

ATE (ā'tē), in Greek mythology, the goddess of hate, injustice, crime and retribution. At the birth of Hercules she led Zeus to make a rash oath, in consequence of which she was hurled from Olympus to the earth, where she still worked mischief. The Litai, daughters of Zeus, followed her, and, if prayed to, repaired the evil she had perpetrated.

ATELES (at'ē-lēs), a genus of South American monkeys, of the division with long prehensile tails, to which the name Sapajou is sometimes collectively applied. The English name of spider-monkey is sometimes used as a generic designation; the fore-limbs are either destitute of a thumb or have a rudimentary one.

ATELLANÆ FABULÆ (at-el-an'ē[ī] fab'ö-lē[ī], called also Oscan plays), a kind of light interlude, in ancient Rome, performed, not by the regular actors, but by freeborn young Romans; it originated from the ancient Atella, a city of the Oscans.

ATHABASCA, a river lake, and former district of Canada. The ATHABASCA or ELK RIVER rises on the E. slopes of the Rocky Mountains in the province of Alberta, flows in a N. E. direction through the province of the same name, and falls into Lake Athabasca after a course of about 750 miles. LAKE ATHABASCA, or Lake of the Hills, is about 190 miles S. S. E. of the Great Slave Lake, with which it is connected by means of the Slave river, a continuation of the Peace. It is about 200 miles in length from E. to W., and about 35 miles wide at the broadest part, but gradually narrows to a point at either extremity. The district of ATHABASKA, formed in 1882, lay immediately E. of British Columbia and N. of Alberta; area about 251,900 square miles. Its territory was in 1905 absorbed by the provinces of Alberta, Saskatchewan, and Manitoba.

ATHABASCAN INDIANS, a linguistic stock of North American Indians, extending from British North America and Alaska to Mexico, who derive their name from Lake Athabasca in British North America. The locations of this Indian family are best given under three groups: Northern, Pacific and Southern. (1) The Northern group includes all the Athabascan tribes of Alaska and British North America, among which are the Ah-tena, K'naiakhotana, Kutchin, Kaiyvh-khotana, Koyu-khotana, Montagnais, Una-khotana, Montoguards, and Takulli. (2) The Pacific group consists of the tribes inhabiting the present States of Washington, Oregon, and California, to which regions they migrated upon the advent of the white man. Among the tribes of this division are Chasta Costa, Kaltserea tunne, Hupa, Chetco, Kenesti, Kwatami, Kwalhiokwa, Micikqwutme, Mikono tunne, Owilapsh, Qwinctunnetun, Teceme, Naltunne, Saiaz, Tcetlestcan tunne, Tolowa, Glatakanai, Yukitce, and Tutu. (3) The Southern group, which is the best known, is composed of the various Apache, Navajo and Lipan tribes, who inhabit Oklahoma, Arizona, New Mexico, and Mexico. The number of these Indians is about 30,000.

ATHANASIAN CREED, a formulary or confession of faith, said to have been drawn up by Athanasius, Bishop of Alexandria, in the 4th century, to justify himself against the calumnies of his Arian enemies. It was famous in the 6th century and commented upon, together with the Lord's Prayer and Apostles' Creed, by Venantius Fortunatus, Bishop of Poitiers. It was not, however, then styled the Athanasian Creed, but simply the Catholic Faith. The Sabellians considered the Father, Son, and Holy Spirit as one in person; this was "confounding the persons": the Arians considered them as differing in essence; this was "dividing the substance"; and against these two errors was the creed originally framed. This creed was used in France about the year 850; was received in Spain about 100 years later, and in Germany about the same time. It was both said and sung in England in the 10th century; was commonly used in Italy at the expiration of that century, and at Rome a little later. This creed is appointed to be read in the Church of England.

ATHANASIUS, ST. (ath-a-nā'shē-us), one of the fathers of the Christian Church, born at Alexandria about 296 A. D. He distinguished himself by his eloquence at the Synod of Nice (325), where his efforts were instrumental in securing the acceptance of the Nicene Creed. The creed which bears his name was supposed to have been formulated by him, but the term Athanasian was not applied to it until some centuries after his death. He became Patriarch of Alexandria in 328, being afterward deposed and reinstated five times. His chief works, including "Orations Against the Arians" and "Festal Letters," appeared in an English translation by Archibald Robertson (New York, 1892). He died in Alexandria, May 2, 373.

ATHARVANA (at-ä'van-ē), the fourth of the Indian Vedas.

ATHEISM, literally, disbelief in a God, if such an attainment is possible; or, more loosely, doubt of the existence of a God; practically, a denial that anything can be known about the supernatural, supposing it to exist. Among the Greeks atheism consisted in a denial or non-recognition of the gods of the state. The atheism of the 18th century was a protest against the persecution of fanaticism; and, like its predecessors, put forward little or nothing to replace the system it attempted to destroy. The atheism of the 19th century may be taken to include every philosophic system which rejects the notion of a personal Creator; in this sense it ranks as a genus, of which Atomism, Pantheism, Positivism, etc., are species. Strictly, it is the doctrine that sees in matter the sole principle of the universe.

ATHEL, or **ÆTHEL**, an Old English word meaning noble, eminent not only in blood or by descent but in mind; frequently a part of Anglo-Saxon proper names.

ATHELING, a title of honor among the Anglo-Saxons, meaning one who is of noble blood. The title was gradually confined to the princes of the blood royal, and in the 9th and 10th centuries is used exclusively for the sons or brothers of the reigning king. It was first conferred on Edgar by Edward the Confessor, his grand-uncle, who bestowed it when he designed to make him successor to himself on the throne.

ATHELNEY, formerly an island in the midst of fens and marshes, now drained and cultivated, in Somersetshire, England, about 7 miles S. E. of Bridgewater. Alfred the Great took refuge in it during a Danish invasion, and afterward founded an abbey there.

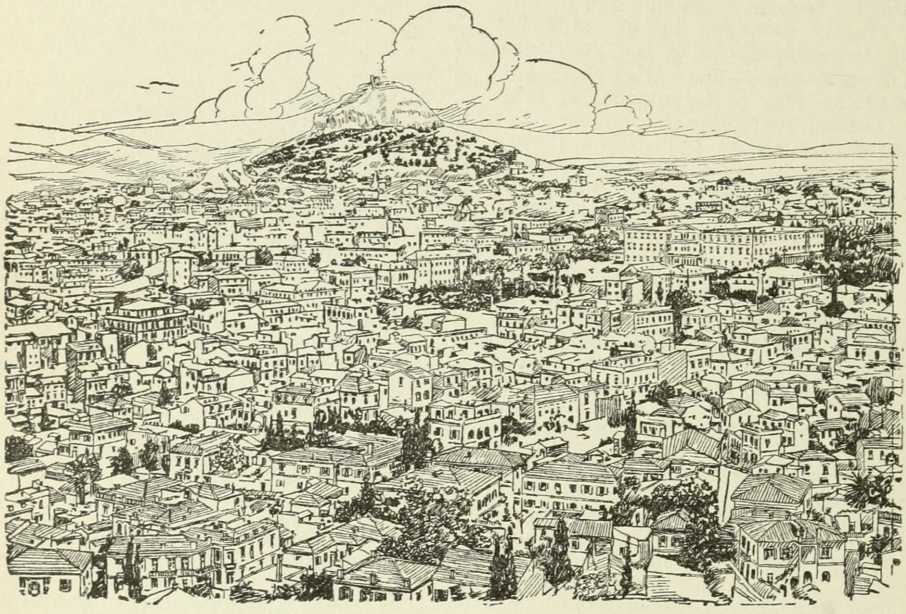
ATHELSTAN, ADELSTAN, ÆTHELSTAN, or **EALSTAN**, an Anglo-Saxon King, the son and successor of Edward the Elder, and grandson of Alfred the Great; born in 895, and on Edward's death, in 925, was chosen king by the people of Mercia and Wessex. Northumbria, Scotland, and the British states of Cumberland, Wales, and Cornwall, acknowledged him as their superior lord, and his alliance was courted by all the princes of western Europe. Louis IV. of France was protected by Athelstan during the usurpation of Raoul, and recovered the throne by his aid. The Emperor Otho the Great married his sister Elgiva. In 937, Constantine of Scotland, and other princes, formed a league against Athelstan, who totally defeated them. He died at Gloucester, A. D. 941.

ATHENA (ath-ē'na), or **ATHENE**, a Greek goddess, identified by the Romans with Minerva. According to the legend, before her birth Zeus swallowed her mother, and Athena afterward sprang from the head of Zeus with a mighty war shout and in complete armor. In her character of a wise and prudent warrior she was contrasted with the fierce Ares (Mars). In the wars of the giants she slew the famed Enceladus. The sculptor, the architect, and the painter, as well as the philosopher, the orator and the poet, considered her their tutelar deity. She is also represented among the healing gods. In the images of the goddess a manly gravity and an air of reflection are united with female beauty in her features. As a warrior she is represented completely armed, her head covered with a gold helmet. As the goddess of peaceful arts she appears in the dress of a Grecian matron. To her insignia belong the ægis, the Gorgon's head, the round argive buckler; and the owl, the cock, the serpent, an olive branch, and a lance were sacred to her. All Attica, particularly Athens, was sacred to her, and she had numerous temples there. Her most brilliant festival at Athens was the Panathenæa, participated in by all the tribes of the city-state.

ATHENS, anciently the capital of Attica and center of Greek culture, now the capital of the Kingdom of Greece. It is situated in the central plain of Attica, about 4 miles from the Saronic Gulf or Gulf of Ægina, an arm of the Ægean Sea running in between the mainland and the Peloponnesus. It is said to have been founded about 1550 B. C. by Cecrops, the mythical Pelasgian hero; and to have borne the name Cecropia until under Erechtheus it received the name of Athens in honor of Athene.

Topography.—The Acropolis, an irregular oval crag, 150 feet high, with a level summit 1,000 feet long by 500 in breadth, was the original nucleus of the city. The three chief eminences near the Acropolis—the Areopagus to the N. W., the Pnyx to the S. W., and the Museum to the S. of the Pnyx—were included within the city boundary as the sites of its chief public buildings, the city itself, however, afterward taking a northerly direction. On the E. ran the Ilissus and on the W. the Cephissus, while to the S. W. lay three harbors—Phalerum, the oldest and nearest; the Piræus, the most important; and Munychia, the Piræan Acropolis. At the height of its prosperity the city was connected with its harbors by three massive walls (the "long walls").

Architecture.—The architectural development of Athens may be dated from the rule of the Pisistratids (560-510 B. C.), who are credited with the foundation of the huge temple of the Olympian Zeus, completed by Hadrian seven centuries later, the erection of the Pythium or temple of Pythian Apollo, and of the



ATHENS, GREECE

Lyceum or temple of Apollo Lyceus—all near the Ilissus; and to whom were due the inclosure of the academy, a gymnasium and gardens to the N. of the city, and the building of the Agora with its Portico or Stoa, Bouleuterium or Senate-house, Tholus and Prytanium. With the foundation of Athenian democracy under Clisthenes, the Pnyx or place of public assembly, with its semi-circular area and cyclopean wall, first became of importance, and a commencement was made to the Dionysiac theater (theater of Dionysus or Bacchus) on the S. side of the Acropolis.

Reconstruction.—After the destruction wrought by the Persians in 480 B. C., Themistocles reconstructed the city upon practical lines, and with a larger area, inclosing the city in new walls 7½ miles in circumference, erecting the N. wall of the Acropolis, and developing the maritime resources of the Piræus; while Cimon added to the southern fortifications of the Acropolis, placed on it the temple of Wingless Victory, planted the Agora with trees, laid out the Academy, and built the Theseum on an eminence N. of the Areopagus; his brother-in-law, Peisianax, erecting the famous Stoa Poecile, a hall with walls covered with paintings (whence the Stoics got their name). Under Pericles the highest point of artistic development was reached. An odeium was erected on the E. of the Dionysiac theater, for the recitations of rhapsodists and musicians; and with the aid of the architects Ictinus and Mnesicles and of the sculptor Phidias the Acropolis was perfected. In the interval between the close of the Peloponnesian War and the battle of Chæronea, few additions were made. Then, however, the long walls and Piræus, destroyed by Lysander, were restored by Conon, and under the orator, Lycurgus, the Dionysiac temple was completed, the Panathenaic stadium commenced, and the choragic monuments of Lysicrates and Thrasyllus erected. Later on Ptolemy Philadelphus gave it the Ptolemæum near the Theseum, Attalus I. the stoa N. E. of the Agora, Eumenes II. that near the great theater, and Antiochus Epiphanes carried on the Olympium. Under the Romans, it continued a flourishing city.

The City in Decline.—But after a time Christian zeal, the attacks of barbarians, and robberies of collectors, made sad inroads among the monuments. About 420 A. D. paganism was totally annihilated at Athens, and when Justinian closed

even the schools of the philosophers, the reverence for buildings associated with the names of the ancient deities and heroes was lost. The Parthenon was turned into a church of the Virgin Mary, and St. George stepped into the place of Theseus. Finally in 1456, the place fell into the hands of the Turks. The Parthenon became a mosque, and in 1687 was greatly damaged by an explosion at the siege of Athens by the Venetians.

Modern Athens.—Soon after the beginning of the War of Liberation, in 1821, the Turks surrendered Athens, but captured it again in 1826-1827. It was then abandoned until 1830. In 1835 it became the royal residence, and made rapid progress. The modern city mostly lies northward and eastward from the Acropolis, and consists mainly of straight and well-built streets. Among the principal buildings are the royal palace, a stately building with a façade of Pentelic marble (completed in 1843), the university, the academy, public library, theater, and observatory. There are four foreign archæological schools or institutes, the French, German, American, and British. During the European War of 1914-1918, Athens was a center of intrigue for the combattant nations, each endeavoring to coerce the government in their favor. These conditions led to occasional violent outbreaks, especially when the Allies sought to disarm the Greeks guarding the city. Pop. about 200,000. See GREECE.

ATHENS, city and county-seat of Clarke co., Ga.; on the Oconee river, and the Central of Georgia, the Georgia, the Southern and the Seaboard Air Line railroads; 67 miles E. of Atlanta, the State capital. It is in a cotton-growing region; has a large trade in that staple; and contains cotton and woolen, cottonseed oil, bobbin, and hosiery mills, iron works, furniture factories, and other industrial plants. It is the seat of the University of Georgia, the State College of Agriculture and Mechanic Arts, Lucy Cobb Institute, and a State Normal School. There are electric light and street railway plants, banks, several hotels, and daily, weekly, and monthly periodicals. Pop. (1910) 14,913; (1920) 16,748.

ATHENS, a city of Ohio, the county-seat of Athens co., on the Hocking river, and the Baltimore and Ohio Southwestern, the Toledo and Ohio Central, and the Hocking Valley railroads. It has important manufactures of lumber products and is the center of an important coal-mining region. There is situated the OHIO STATE UNIVERSITY (*q. v.*), a State hospital for the insane, a library, and other public buildings. Pop. (1910) 5,463; (1920) 6,418.

ATHERINE, a pretty little fish, from five to six inches long, called also the sandsmelt. It is the *A. presbyter* of Cuvier. It is found along the southern coasts of Europe, occupying a region distinct from that in which the smelt (*osmerus eperlanus*) occurs. It is used as food. There is an American species, the *menidia notata*, commonly called silversides.

Of the form atherina, a genus of fishes of the order *acanthopterygii* and the family *mugilidæ* (mullets). Several species are known in the Mediterranean and elsewhere. The young, which congregate together, are the aphyes of the ancients. Now, in the S. of Europe, they are called nonnat.

ATHERTON, GERTRUDE FRANKLIN, an American author, born in San Francisco, Cal.; a great-grandniece of Benjamin Franklin; was educated in California and Kentucky, and married the late George H. B. Atherton. She began her literary work while living in San Francisco in 1878, and has made a specialty of describing Spanish life in California as it was previous to 1846. Her publications include "The Doomswoman" (1892); "Before the Gringo Came" (1894); "American Wives and English Husbands" (1898); "The Californians" (1898); "A Daughter of the Vine" (1899); "Senator North" (1900); "Aristocrats" (1901); "Rulers of Kings" (1904); "Rezanov" (1906); "Ancestors" (1907); "The Tower of Ivory" (1910); Perch of the Devil" (1914); "Mrs. Balfame" (1916); etc.

ATHLETES, combatants who took part in the public games of Greece. The profession was an honorable one; tests of birth, position, and character were imposed, and crowns, statues, special privileges, and pensions were among the rewards of success. In April, 1896, the ancient Olympic games were revived at Athens (the 776th Olympiad) under the personal patronage of the King of Greece, who presented crowns of victory to 44 contestants, of whom 11 were from the United States, the largest number of victors from any country. The widespread interest in the games led to the formation of an international committee to arrange for future contests, the first one taking place in Paris during the Exposition of 1900. Olympic games were resumed at the Pan-American Exposition, Buffalo, 1901. See OLYMPIC GAMES.

ATHLONE, a town in Ireland, on both sides of the Shannon, chiefly in West-

meath, 80 miles W. of Dublin by rail. The Shannon is crossed by a fine bowstring and lattice iron bridge of two arches, 175 and 40 feet span. Athlone Castle, founded in the reign of King John, was one of the chief military positions in Ireland. In the war of 1688 it was unsuccessfully besieged by William III. in person, but was afterward taken by Gen. Ginkell. The fortifications cover 15 acres, and contain barracks for 1,500 men. Pop. 10,000.

ATHOL, a town in Worcester co., Mass., on Miller's river, and the Boston and Albany, and the Boston and Maine railroads; 44 miles N. W. of Worcester. It has electric railways connecting with the suburbs, and is principally engaged in the manufacture of cotton warps, shoes, sewing silk, fine mechanical tools, matches, organ cases, pocket-books, billiard tables, and furniture. The town has several National banks, public library, high school, and several weekly and monthly periodicals. Pop. (1910) 8,536; (1920) 9,792.

ATHOR, HATHOR, or **HETHER**, an Egyptian goddess, identified with Aphrodite or Venus. Her symbol was the cow bearing on its head the solar disk and hawk feather plumes. Her chief temple was at Denderah. From her the third month of the Egyptian year derived its name.

ATHOS, MOUNT, or **HAGION-OROS**, or **MONTE SANTO**, a famous mountain of Turkey in Europe, on a peninsula projecting into the Ægean Sea, between the Gulfs of Contesa and Monte Santo. It rises abruptly from the water to a height of 6,349 feet above sea level, and in its lower parts is covered with forests of pine, oak, chestnut, etc., above which towers a bare conical peak. Herodotus states that the fleet of Mardonius, the Persian general, in attempting to double this mountain, was reported to have lost more than 300 ships and 20,000 men. When Xerxes invaded Greece he determined to guard against the recurrence of a similar disaster by cutting a canal across the peninsula; of which great work the traces still remain. In modern times, Athos has been occupied for an extended period by a number of monks of the Greek Church, who live in a sort of fortified monasteries, in number about 20, of different degrees of magnitude and importance. These, with the farms or *metochis* attached to them, occupy the whole peninsula; hence it has derived its modern name of Monte Santo. These monasteries are situated in positions of strikingly romantic beauty. Some of them belong to Russians, others to Bulgarians and Serbians.

ATITLAN (at-it'lan), a lake and mountain of Central America, in Guatemala. The lake is about 24 miles long and 10 broad; the mountain is an active volcano, 12,160 feet high.

ATKINS, ALBERT HENRY, an American sculptor, born in Milwaukee. He studied art in Boston and in Paris. In 1909 he became a member of the faculty of the Rhode Island School of Design, Department of Sculpture. Among his best known works are the Copenhagen Memorial Fountain at Boston, and the Lapham Memorial at Milwaukee. He also made architectural sculptures for several churches and many protraits and ideal sculptures. He was a member of the American Federation of Arts and other art societies.

ATKINSON, EDWARD, an American political economist, born in Brookline, Mass., Feb. 10, 1827; graduate of Dartmouth College. He has become widely known by his papers and pamphlets on trade competition, banking, railroading, fire prevention, the money question, tariff, etc. Soon after the battle in Manila Bay, he was elected vice-president of the Anti-Imperialist League. Among his publications are "The Distribution of Products" (1885); "Industrial Progress of the Nation" (1889); "The Science of Nutrition" (1892); "Taxation and Work" (1892); "Every Boy His Own Book" (1893); etc. He died in Boston, Mass., Dec. 11, 1905.

ATKINSON, ELEANOR, an American author, born at Rensselaer, Ind. She was educated at the Indianapolis Normal Training School, for several years taught at Indianapolis and Chicago, and was a special writer on the Chicago press. Her writings include "The Boyhood of Lincoln" (1908); Lincoln's Love Story" (1909); "The Story of Chicago" (1910); "Johnny Appleseed" (1915); "Hearts Undaunted" (1917); etc.

ATLANTA, a city of Georgia, the county-seat of Fulton co., and the capital of Georgia. It is on the Atlantic, Birmingham and Atlantic, the Georgia, the Louisville and Nashville, the Nashville, Chattanooga and St. Louis, the Seaboard Air Line, the Southern, and other railroads. Atlanta is the most important industrial and commercial center of the Southeast and is also the financial center and the central distributing point for the Southeast. It lies in the heart of one of the richest regions of the world, as yet largely undeveloped. It had in

1920 over 600 factories manufacturing over 1,000 different articles, with a product of about $80,000,000 per year. These factories give employment to over 30,000 operators. There are also 500 branch offices of manufacturing plants located outside the city. The most important products are cotton goods, fertilizers, cart wheels, machinery, lumber, terra cotta, bricks, wagons, furniture, cottonseed oil, etc. It is an important educational center, having 52 institutions of learning in addition to 64 public schools and commercial colleges. Among the leading institutions of higher education are the Georgia School of Technology, Emory University, Oglethorpe University, and Lanier University. There are also several colleges for women, including the Agnes Scott College, Scott College and Conservatory, and Elizabeth Mather College, and five colleges for negroes. There are 18 public parks and playgrounds, a fine public library, a State library, the State capitol, city hall, custom house, Carnegie library, and other important public buildings. There is an auditorium with a seating capacity of 8,000 in which performances are given annually by the Metropolitan Grand Opera Co. There are 20 banks and trust companies. The bank clearings in 1919 amounted to $3,219,186,317. The assessed value of real estate in 1919 was $145,670,012, and of personal property $58,237,329. There were in 1920 405 miles of water mains and a sewerage disposal plant which was erected at a cost of nearly $4,000,000. The Federal Reserve Bank of the Sixth District is located in the city. Atlanta is an important city for the publication of newspapers and periodicals.

The city was founded in 1837 as Marthasville. It was later known as Terminus, and was finally named Atlanta. It was almost entirely destroyed by Sherman after the Battle of Atlanta in 1864. The increase in population following the Civil War was rapid. Pop. (1890) 65,533; (1900) 89,872; (1910) 154,839; (1920) 200,616.

ATLANTES, in architecture, colossal statues of men used instead of pillars to support an entablature. Roman architects called them *telamones* (Greek). When statues of women support an entablature, they are generally called caryatides.

ATLANTIC CITY, a city and noted seaside resort in Atlantic co., N. J.; on a long, sandy island, known as Absecon Beach; 60 miles S. E. of Philadelphia, with which it is connected by steam and electric railroads. The island stretches along the coast for 10 miles; has an average width of ¾ of a mile, and is from 4 to 5 miles from the mainland. At the N. end is the Absecon Light, well known to coastwise sailors. The city has several miles of bathing beach, a magnificent promenade on the ocean front, a very large number of hotels and boarding houses, electric lights, public schools, churches of the principal denominations, several National banks, and daily, weekly, and monthly periodicals. It is probably the first all-the-year-round resort in the United States, its splendid climate giving it a large popular patronage even in the dead of winter. The transient population varies, but is estimated at from 400,000 to 500,000. Pop. (1910) 46,150; (1920) 50,707.

ATLANTIC OCEAN, the vast expanse of sea lying between the W. coasts of Europe and Africa and the E. coasts of North and South America, and extending from the Arctic to the Antarctic Oceans; greatest breadth, between the W. coast of northern Africa and the E. coast of Florida, 4,150 miles; least breadth, between Norway and Greenland, 930 miles; superficial extent, 25,000,000 square miles. The principal inlets and bays are Baffin and Hudson Bays, the Gulf of Mexico, the Caribbean Sea, the North Sea, or German Ocean, the Bay of Biscay, and the Gulf of Guinea. The principal islands N. of the equator are Iceland, the Faroe and British Islands, the Azores, Canaries, and Cape de Verde Islands, Newfoundland, Cape Breton, and the West India Islands; and S. of the equator, Ascension, St. Helena, and Tristan da Cunha.

Principal Currents.—The great currents of the Atlantic are the Equatorial current (divisible into the main, northern, and southern equatorial currents), the Gulf Stream, the north African and Guinea current, the southern connecting current, the southern Atlantic current, the Cape Horn current, Rennels current, and the Arctic current. The current system is primarily set in motion by the trade winds which drive the water of the intertropical region from Africa toward the American coasts. Besides the surface currents, an under current of cold water flows from the poles to the equator, and an upper current of warm water from the equator toward the poles.

Depths.—The greatest depth yet discovered is N. of Porto Rico, in the West Indies, namely 27,360 feet. Cross-sections of the North Atlantic between Europe and America show that its bed consists of two great valleys lying in a north and south direction, and separated by a ridge, on which there is an average

depth of 1,600 or 1,700 fathoms, while the valleys on either side sink to the depth of 3,000 or 4,000 fathoms. A ridge, called the Wyville-Thomson Ridge, with a depth of little more than 200 fathoms above it, runs from near the Butt of Lewis to Iceland, cutting off the colder water of the Arctic Ocean from the warmer water of the Atlantic. The South Atlantic, of which the greatest depth yet found is over 3,000 fathoms, resembles the North Atlantic in having an elevated plateau or ridge in the center, with a deep trough on either side. The saltiness and specific gravity of the Atlantic gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. In the neighborhood of the British Isles the salt has been stated at one-thirty-eighth of the weight of the water. The North Atlantic is the greatest highway of ocean traffic in the world.

ATLANTIS, or **ATLANTICA**, an island, said by Plato and others to have once existed in the ocean immediately beyond the Straits of Gades; that is, in what is now called the Atlantic Ocean, a short distance W. of the Straits of Gibraltar. Homer, Horace, and some others made two Atlanticas, distinguished as the Hesperides and the Elysian Fields, and believed to be the abodes of the blessed. Atlantis is represented as having ultimately sunk beneath the waves, leaving only isolated rocks and shoals in its place. "The New Atlantis" is the title which Lord Bacon gives to a literary fragment, in which he sketched out an ideal commonwealth.

ATLANTOSAURUS, a gigantic fossil reptile, order *dinosauria*, obtained in the upper Jurassic strata of the Rocky Mountains, attaining a length of 80 feet or more.

ATLAS, an extensive mountain system in north Africa, starting near Cape Nun, on the Atlantic Ocean, traversing Morocco, Algiers and Tunis, and terminating on the coast of the Mediterranean; divided generally into two parallel ranges, running W. to E., the Greater Atlas lying toward the Sahara, and the Lesser Atlas toward the Mediterranean. The principal chain is about 1,500 miles long, and the principal peaks rise above or approach the line of perpetual congelation. The highest elevations are almost 15,000 feet, many other peaks averaging 11,000 feet. Silver, antimony, lead, copper, iron, etc., are among the minerals. The vegetation is chiefly European in character, except on the low grounds and next the desert.

ATLAS, in Greek mythology, the name of a Titan, whom Zeus condemned to bear the vault of heaven. The same name is given to a collection of maps and



ATLAS

charts, and was first used by Gerard Mercator in the 16th century, the figure of Atlas bearing the globe being given on the title-pages of such works.

ATLAS, in anatomy, is the name of the first vertebra of the neck, which supports the head. It is connected with the occipital bone in such a way as to permit of the nodding movement of the head, and rests on the second vertebra, or axis, their union allowing the head to turn from side to side.

ATMOSPHERE, literally, the air surrounding our planet, and which, as the etymology implies, is, speaking broadly, a "sphere" (not, of course, a solid, but a hollow one). With strict accuracy, it is a hollow spheroid. Its exact height is unknown. At 2.7 miles above the surface of the earth, half its density is gone, and the remainder is again halved for every further rise of 2.7 miles. Some small density would remain at 45 miles high. At 80 miles, this would have all but disappeared. But from sundry observations, made at Rio Janeiro and elsewhere, on the twilight arc, M. Liais infers that the extreme limit of the atmosphere is between 198 and 212 miles.

In the lower strata of the atmosphere, the temperature falls at least a degree for every 352 feet of ascent; hence, even in the tropics, mountains of any considerable elevation are snow-capped. The atmosphere appears to us blue, because, absorbing the red and yellow solar rays, it reflects the blue one. There appears to be no atmosphere around the moon; but the case seems different with the sun, Venus, Mars, Jupiter, and Saturn.

Figuratively, any pervading intellectual, moral, religious, or other influence by which one is surrounded; as in the expression, "He lives in an atmosphere of suspicion."

ATMOSPHERIC PRESSURE, the pressure exerted by the atmosphere, not merely downward, but in every direction. It amounts to 14.7 pounds of weight on each square inch, which is often called in round numbers 15. On a square foot it is=2,160 pounds, or nearly a ton. It would act upon our bodies with crushing effect were it not that the pressure, operating in all directions, produces an equilibrium. If any gas or liquid press upon a surface with a force of 15 pounds on a square inch, it is generally described as having a pressure of one atmosphere; if 60 pounds, of four atmospheres; if 120 pounds, of eight atmospheres, and so on.

ATOLL, the name applied by geologists and others to any one of the lagoon islands, or annular coral reefs found in the Pacific and the Indian Oceans, the Red Sea, and some other parts of the tropics. An atoll is a ring of coral rock, oval rather than circular in form. On the top of the coral rock, which rises but slightly above the sea-level, is vegetation of some luxuriance. On the convex circumference of the ring is a beach of white sand, exterior to which is a line of breakers. The ring of land, which is less than half a mile across, encircles a lagoon. In the larger atolls there are generally two or three breaks in the ring, affording ship channels into the lagoon; these mark the spots where fresh water, discharged from the old subsiding land into the sea, prevented the coral animals, which are marine, from locating themselves or building.

ATOM, in mental philosophy, a particle of matter so infinitely small that it cannot again be subdivided.

In natural philosophy, one of the exceedingly minute ultimate particles of matter, aggregates of an immense number of which, held in their place by molecular forces, constitute all material bodies.

In chemistry, the smallest particle into which an element can be divided. An atom cannot exist in a separate state, but unites with one or more atoms to form a molecule. The atoms of different elements have definite relative weights fixed and invariable for each, the weight of an atom of hydrogen being regarded as unity.

ATOMIC PHILOSOPHY, in mental and natural philosophy, the doctrine of atoms, broached by Leucippus, developed by Democritus and modified by Epicurus. It represented atoms as possessed of gravity and motion, and attributed to their union the formation of all things.

ATOMIC THEORY, a theory, first propounded by John Dalton in his "New System of Chemical Philosophy," published in 1807. He stated that the atoms of each element were incapable of being subdivided, and each had a definite relative weight, compared with that of hydrogen as 1; that the composition of a definite chemical compound is constant; that if two elements, A and B, are capable of uniting with each other in several proportions, the quantities of B, which unite with a given quantity of A, usually bear a simple relation to one another. Dalton supposed that one element replaced another atom for atom, but it has since been found that one atom of an element can replace one or more atoms of another element, according to their respective atomicities.

ATOMIC WEIGHTS, the proportions by weight in which the various elementary substances unite together. It is necessary that one element be selected as the starting-point of the series and an arbitrary sum affixed to it, so that thereby all the other elements can have their sums awarded to them, according to the proportional amounts in which they combine with each other. The second law mentioned under the atomic theory explains the manner in which this can be done, and how far the numbers are arbitrary. In all systems of atomic weights in modern use, the atomic weight of hydrogen is taken as unity, and the atomic weight of the other elements are then fixed, so as to give on the whole the simplest and most consistent formula for their compounds. There are two systems of atomic weights at present in use: (1) The old system, which, after much discussion, was adopted about 1845; and (2) the new system, which is, in many respects, a revival of the system of Berzelius, and which may be said to have come into general use by scientific chemists about 1860.

ATONEMENT, in theology, the sacrificial offering made by Christ in expiation of the sins, according to the Calvinists, of the elect only; according to the Arminians, of the whole human race.

The Day of Atonement, or the Great Day of Atonement, was on the 10th of the seventh month. It is still observed as a day of humiliation and supplication by Hebrews all over the world.

ATRATO (at-rä'to), a river of Colombia, interesting because it has repeatedly been made to bear a part in schemes for a ship canal across the Isthmus of Panama. Rising on the Western Cordillera at an altitude of 10,560 feet above sea-level, it runs for about 400 miles northward through low, swampy country, and falls by several mouths, interrupted by bars, into the Gulf of Darien. It is navigable by steamers for fully 250 miles, being 750 to 1,000 feet wide, and 8 to 70 feet deep. A route, surveyed by the United States Government in 1871, proposed to connect the Atrato and the Jurador, flowing into the Pacific, by a canal 48 miles long. At the Paris International Congress (1879) for deciding the best route for the interoceanic canal, that route was with various others rejected in favor of Panama. Gold-dust is found in and about the Atrato.

ATREK (ä-trek'), a river of Persia, rising in Khorassan, among the Hazár Masjid Mountains, and thence flowing nearly 350 miles westward to the Caspian Sea, from Shatt downward along the boundary with the Russian Empire.

ATREUS (āt'rös), the son of Pelops and Hippodamia. He and his brother Thyestes murdered their half-brother Chrysippus, from jealousy of the affection entertained for him by their father. Thereupon, they fled to Eurystheus, with whose daughter Ærope, Atreus united himself, and, after the death of his father-in-law became King of Mycene. Thyestes seduced the wife of his brother and had two sons by her. Atreus, after the discovery of this injury, banished Thyestes with his sons. Thirsting for revenge, Thyestes conveyed away secretly a son of his brother, and instigated him to murder his own father. This design was discovered, and the youth, whom Atreus thought to be the son of his brother, was put to death. Too late did the unhappy father perceive his mistake. He pretended to be reconciled to Thyestes, and invited him, with his two sons, to a feast; and after he had caused the latter to be secretly slain, he placed a dish made of their flesh before Thyestes, and, when he had finished eating, brought the bones of his sons, and described the dreadful revenge which he had taken.

ATRIPLEX, a genus of plants belonging to the order *chenopodiaceæ* (chenopods). Eight species are indigenous, and one or two more partially naturalized, in Great Britain. Of the former may be mentioned the *A. laciniata*, or frosted sea-orache; the *A. babingtoni*, or spreading fruited; the *A. patulla*, or spreading halberd-leaved; the *A. angustifolia*, or narrow-leaved orache; and the *A. littoralis*, or grass-leaved sea-orache. The leaves may be used as pot herbs.

ATRIUM, in ancient times, the hall or principal room in an ancient Roman house. It communicated with the street by the vestibule and the front door. There was in the center of its ceiling a large aperture, called *compluvium*, designed to admit light. Beneath it there was scooped out in the pavement a cistern called *impluvium*. In a large house, rooms opened into the atrium from all sides, and were lighted from it.

In medieval times, till the 12th century, a covered court. After the 12th century, the churchyard.

ATROPA, a genus of plants belonging to the order *solanaceæ*, or nightshades. It contains the well-known species, *A. belladonna*, or deadly nightshade. It is three or more feet high, has its ovate leaves paired, large and small together, drooping lurid purple flowers, and blackberries of the size of a small cherry, which if eaten produce delirium, dilation of the pupils of the eyes, and death. The flowers and fruit are both powerful medicinal agents. It is largely used by the homœopathic school.

ATROPHY, a wasting of the flesh due to some interference with the nutritive processes. It may arise from a variety of causes, such as permanent, oppressive and exhausting passions, organic disease, a want of proper food or of pure air. In old age the whole frame except the heart undergoes atrophic change, and it is of frequent occurrence in infancy as a consequence of improper, unwholesome food, exposure to cold, damp or impure air, etc. Single organs or parts of the body may be affected irrespective of the general state of nutrition.

ATROPIN, or **ATROPINE**, a crystalline alkaloid obtained from the deadly nightshade (*atropa belladonna*). It is very poisonous and produces persistent dilation of the pupil.

ATROPOS, the eldest of the Fates, who cuts the thread of life with her shears.

ATTACHÉ (at-a-shā), a military, naval or subordinate member of the diplomatic service attached to an embassy or legation.

ATTACHMENT, in law, the taking into the custody of the law the person or property of one already before the court, or of one whom it is sought to bring before it. Attachment of person: A writ issued by a court of record, commanding the sheriff to bring before it a person who has been guilty of contempt of court, either in neglect or abuse of its process or of subordinate powers. Attachment of property: A writ issued at the institution or during the progress of an action, commanding the sheriff or other proper officer to attach the property, rights, credits or effects of the defendant to satisfy the demands of the plaintiff. The laws and practice concerning the attachment vary in different countries.

In the United States attachment may be defined as the taking into the custody of the law the person or property of one who is already before the court, or of one whom it is sought to bring before the court; also a writ for this purpose. To some extent it is of the nature of a criminal process. In some States a plaintiff can at the beginning of an action to recover money attach the property of the defendant as a security for the payment of the judgment expected to be recovered; and in case of recovery the property is applied in satisfaction of the judgment. But the more usual rule is that there can be no seizure of property, except in specified cases, till the rights of the parties have been settled by judgment of the court. The exceptions are chiefly in cases where the defendant is a non-resident or a fraudulent debtor, or is attempting to conceal or remove his property. In some States, attachments are distinguished as foreign and domestic—the former issued against a non-resident having property within the jurisdiction of the State, the latter against a resident in the State; jurisdiction over the person or property being necessary for an attachment. An attachment issued under a State law which has not been adopted by Congress, or by a rule of court, cannot be sustained in a United States court. Money due to a seaman for wages is not attachable in the hands of a purser, the purser being a distributing agent of the government, and in no sense a debtor of the seaman.

ATTALEA, a genus of American palms, comprising the piassava palm, which produces coquilla nuts.

ATTALUS (at'ā-lus), the names of three kings of ancient Pergamus, 241-133 B. C., the last of whom bequeathed his kingdom to the Romans. They were all patrons of art and literature.

ATTAR, or OTTO, OF ROSES (oil of roses), an essential oil obtained from the petals of three species of roses, viz., *rosa centifolia, moschata* and *damascena*. The rose gardens of Ghazipur, in India, have long been famed for the production of this precious liquid. These gardens are large fields, planted with rows of small rose bushes. The blossoms, which unfold in the morning, are all gathered before noon, and their petals are at once transferred to clay stills, and distilled with twice their weight of water. The rose water which comes over is placed in shallow vessels covered with moist muslin to exclude dust, and exposed all night to the cool air. In the morning the thin film of oil which has collected on the top is carefully swept off with a feather and transferred to a small vial. This process is repeated morning after morning, till nearly the whole of the oil is separated from the water. Attar is also imported from Syria, Persia, Turkey, and Bulgaria. It is frequently adulterated with spermaceti and a volatile oil, which appears to be derived from one or more species of *andropogon*, and which is called oil of gingergrass, or oil of geranium. Pure attar of rose, carefully distilled, is at first colorless, but speedily becomes yellowish. It congeals below 80°; melts at 84°.

ATTENTION. See PSYCHOLOGY.

ATTERBURY, FRANCIS, an English prelate, born March 6, 1662, and educated at Westminster and Oxford. In 1687, he took his degree of M. A., and appeared as a controversialist in a defense of the character of Luther, entitled "Considerations on the Spirit of Martin Luther," etc. He also assisted his pupil, Charles Boyle, in his famous controversy with Bentley on the "Epistles of Phalaris." Having taken orders, in 1691, he settled in London, became chaplain to William and Mary, preacher of Bridewell, and lecturer of St. Bride's. After the accession of Queen Anne he was made Dean of Carlisle. In 1712, he was made Dean of Christ Church, and, in 1713, Bishop of Rochester and Dean of Westminster. After the death of the Queen, in 1714, he distinguished himself by his opposition to George I.; and, having entered into a correspondence with the Pretender's party, was, in 1722, committed to the Tower. Being banished from the kingdom, he settled in Paris.

He died Feb. 15, 1732, and his body was privately interred in Westminster Abbey.

ATTERBURY, WILLIAM WALLACE, an American railway official, born in New Albany, Ind., in 1866. He graduated from Yale University in 1886, and he served as an apprentice in shops of the Pennsylvania Railroad, then became road foreman for various divisions of that line. He was rapidly promoted, becoming general manager of the lines east of Pittsburgh and Erie in 1903, serving until 1909. He was made a vice-president of the Pennsylvania Railroad in 1909. In 1917 he was given general charge of the construction and operation of the United States military railroads in France with a commisson of brigadier-general. Largely through his efforts this field of operation became highly organized in France and had much to do with the success of the American Expeditionary Force in its campaigns. He was a member of several engineering societies.

ATTICA, a state of ancient Greece, the capital of which, Athens, was once the first city in the world. The territory was triangular in shape, with Cape Sunium (Colonna) as its apex and the ranges of Mounts Cithæron and Parnes as its base. On the N. these ranges separated it from Bœotia; on the W. it was bounded by Megaris and the Saronic Gulf; on the E. by the Ægean. Its most marked physical divisions consisted of the highlands, midland district, and coast district, with the two famous plains of Eleusis and of Athens. The Cephissus and Ilissus, though small, were its chief streams; its principal hills, Cithæron, Parnes, Hymettus, Pentelicus, and Laurium.

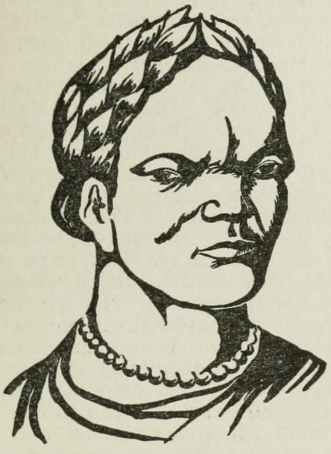
History.—According to tradition the earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came, 1550 B. C., with a colony from Egypt, taught them all the essentials of civilization, and founded Athens. One of Cecrops' descendants founded 11 other cities. To Theseus is assigned the honor of uniting these cities in a confederacy, with Athens as the capital, thus forming the Attic state. After the death of Codrus, 1068 B. C., the monarchy was abolished, and the government vested in archons elected by the nobility, at first for life, in 752 B. C. for 10 years, and in 683 B. C. for one year only. The severe Constitution of Draco was succeeded in 594 B. C. by the milder code of Solon, the democratic elements of which, after the brief tyranny of the Pisistratids, were emphasized and developed by Clisthenes, He divided the people into 10 classes, and made the Senate consist of 500 persons, establishing as the government an oligarchy modified by popular control. Then came the splendid era of the Persian War, which elevated Athens to the summit of fame. Miltiades at Marathon and Themistocles at Salamis conquered the Persians by land and by sea. Attica appears to have contained a territory of nearly 850 square miles, with some 500,000 inhabitants, 360,000 of whom were slaves, while the inhabitants of the city numbered 180,000. Cimon and Pericles, 444 B. C., raised Athens to its point of greatest splendor, though under the latter began the Peloponnesian War, which ended with the conquest of Athens by the Lacedæmonians. The succeeding tyranny of the Thirty, under the protection of a Spartan garrison, was overthrown by Thrasybulus, with a temporary partial restoration of the power of Athens; but the battle of Cheronæa (338 B. C.) made Attica, in common with the rest of Greece, a dependency of Macedon. The attempts at revolt after the death of Alexander were crushed, and in 260 B. C. Attica was still under the sway of Antigonus Gonatus, the Macedonian king. A period of freedom under the shelter of the Achæan League then ensued, but their support of Mithridates led in 146 B. C. to the subjugation of the Grecian states by Rome. After the division of the Roman empire Attica belonged to the empire of the East until, in 396 A. D., it was conquered by Alaric the Goth, and the country devastated.

Attica, along with the ancient Bœotia, now forms a nome or province (Attike and Viotia) of the kingdom of Greece; area, 2,472 square miles; pop. about 450,000.

ATTICUS, TITUS POMPONIUS (at'ēkus), a noble Roman, the contemporary of Cicero and Cæsar. He displayed such address and tact, that, during the war between Cæsar and Pompey, he managed to remain neutral; sent money to the son of Marius, while he secured the attachment of Sylla; and, when Cicero and Hortensius were rivals, was equally intimate with both. When young, he resided at Athens. He was an author and poet, and reached the age of 77, without sickness. When at last he became ill, he refused all nourishment, and, therefore, ended his life by voluntary starvation. Died 32 B. C. He was a disciple of Epicurus.

ATTILA (at'ē-la), the famous leader of the Huns, was the son of Mundzuk, succeeding (with his brother Bleda) their uncle Rhuas. Their rule extended over a great part of northern Asia and

Europe, and they threatened the Eastern Empire, and twice compelled the weak Theodosius II. to purchase an inglorious peace. Attila caused his brother Bleda to be murdered (444), and extended his dominion over all the peoples of Germany and exacted tribute from the Eastern



ATTILA, THE HUN

and Western emperors. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners, and he speedily formed a pretext for leading them against the Empire of the East. He laid waste all the countries from the Black to the Adriatic Sea, and in three encounters defeated the Emperor Theodosius, but could not take Constantinople. Thrace, Macedonia, and Greece all submitted to the invader, who destroyed 70 flourishing cities; and Theodosius was obliged to purchase a peace. Turning to the W., the "scourge of God," as the universal terror termed him, crossed with an immense army the Rhine, the Moselle, and the Seine, went to the Loire, and laid siege to Orleans. The inhabitants of this city repelled the first attack, and the united forces of the Romans under Aetius and of the Visigoths under their King Theodoric, compelled Attila to raise the siege. He retreated to Champagne, and waited for the enemy in the plains of Chalons. When the victory of Attila seemed assured the Gothic prince, Thorismond, the son of Theodoric, poured down from the neighboring height upon the Huns, who were defeated with great slaughter. In the following year Attila tried to seize upon Italy, and demanded Honoria, the sister of Valentinian III., in marriage, with half the kingdom as a dowry. When this demand was refused he conquered and destroyed Aquileia, Padua, Vicenza, Verona, and Bergamo, laid waste the plains of Lombardy, and was marching on Rome when Pope Leo I. went with the Roman ambassadors to his camp and succeeded in obtaining a peace. Attila went back to Hungary, and died on the night of his marriage with Hilda or Ildico (453), either from the bursting of a blood vessel or by her hand.

ATTLEBORO, a town in Bristol co., Mass., on the New York, New Haven and Hartford railroad; 32 miles S. W. of Boston. It was incorporated in 1694; contains nearly a dozen villages; and is principally engaged in the manufacture of jewelry, watches and clocks, silverware, hats, buttons, and cotton and woolen goods. It has a National bank, high school, public library, and daily newspapers. Pop. (1910) 16,215; (1920) 19,731.

ATTORNEY, a person appointed to do something for and in the stead and name of another. An attorney may have general powers to act for another; or, his power may be special, and limited to a particular act or acts. A special attorney is appointed by a deed called a power or letter of attorney, specifying the acts which he is authorized to do. An attorney at law is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. The rules and qualifications, whereby one is authorized to practice as an attorney in any court are very different in different countries, and in the different courts of the same country.

ATTORNEY-GENERAL, a governmental law officer. In the United States the Department of Justice is presided over by the Attorney-General, whose duty it is to furnish all legal advice needed by Federal authorities and conduct all litigation in which the United States is concerned. He is also called upon to recommend persons to fill the places of judges of the United States Circuit and District Courts. There is an Attorney-General in each State whose duty it is to furnish legal advice to the Legislature; he represents the State in suits at law, and aids in prosecuting offenses against the State.

In England the highest legal functionary permanently retained, on a salary, to take the part of the crown in any suits affecting the royal (by which is really meant the public) interests. In precedence, he ranks above the Solicitor-General.

ATTRACTION, in natural philosophy, a force in virtue of which the material

particles of all bodies tend necessarily to approach each other. It operates at whatever distances the bodies may be from each other, whether the space between them be filled with other masses of matter or is vacant, and whether the bodies themselves are at rest or are in motion. When they are not closely in contact, the attraction between them is called that of gravitation or of gravity.

It is of various kinds: (1) The attraction of gravitation or of gravity is the operation of the above-mentioned attraction when the bodies acting and acted upon are not closely in contact. It is often called the law of gravity or gravitation, but the term law in this case means simply generalization. It states the universality of a fact, but does not really account for it. By this law or generalization, the attraction between any two material particles is directly proportional to the product of their masses, and inversely proportional to the square of their distance asunder. (2) Molecular attraction differs from the former in acting only at infinitely small distances. It ceases to be appreciable when the distances between the molecules become appreciably large. It is divided into cohesion, affinity, and adhesion.

Capillary attraction, meaning the attraction excited by a hair-like tube on a liquid within it, is, properly speaking, a variety of adhesion.

In magnetism, the power excited by a magnet or loadstone of drawing and attaching iron to itself.

In electricity, the power possessed by an electrified body of drawing certain other bodies to itself. The repulsions or attractions between two electrified bodies are in the inverse ratio of the squares of their distance. The distance remaining the same, the force of attraction or repulsion between two electrified bodies is directly as the product of the quantities of electricity with which they are charged.

ATTUCKS, CRISPUS, a mulatto or half-breed Indian, born about 1720; was a leader of the crowd of people, who, on March 5, 1770, provoked the British soldiers in Boston to open fire, which resulted in the death of Attucks and others and created the incident known as the Boston massacre. The British officer of the day and six of his men were tried for murder and acquitted by a jury.

ATWATER, WILBER OLIN, an American chemist, born in Johnsburg, N. Y., May 3, 1844; was graduated at Wesleyan University in 1865; made a special study of chemistry in the Sheffield Scientific School of Yale and the Universities of Leipsic and Berlin; became Professor of Chemistry in East Tennessee University in 1873; was director of the Connecticut Agricultural Experiment Station in 1875-1877, and was appointed director of the Storrs (Conn.) Experiment Station in 1887. He was connected for several years with the United States Department of Agriculture. He died in 1907.

ATYS, or ATTYS (at'is), in classical mythology, the shepherd lover of Cybēle, who, having broken the vow of chastity which he made her, castrated himself. In Asia Minor Atys seems to have been a deity, with somewhat of the same character as Adonis.

AUBE (ōb), a N. E. French department; area, 2,326 square miles; pop. about 240,000. The surface is undulating, and watered by the Aube, etc. The N. and N. W. districts are bleak and infertile, the S. districts remarkably fertile. A large extent of ground is under forests and vineyards, and the soil is admirable for grain, pulse, and hemp. The chief manufactures are worsted and hosiery. Troyes is the capital. The river Aube, which gives name to the department, rises in Haute-Marne, flows N. W., and, after a course of 113 miles, joins the Seine. Capital, Troyes.

AUBER, DANIEL FRANÇOIS ESPRIT (ō-bā'), a French operatic composer, born Jan. 29, 1782, at Caen, in Normandy; studied under Cherubini. His first great success was his opera "La Bergère Châtelaine," produced in 1820. In 1822 he had associated himself with Scribe as librettist, and other operas followed. Chief among them were "Masaniello; or La Muette de Portici" (1828); "Fra Diavolo" (1830); "Lestocq" (1834); "L'Ambassadrice" (1836); "Le Domino Noir" (1837); "Les Diamants de la Couronne" (1841); "Marco Spada" (1853); "La Fiancée du Roi de Garbe" (1864). Despite his success in "Masaniello" his peculiar field was comic opera. He died in Paris, May 13, 1871.

AUBURN, city and county-seat of Androscoggin co., Me.; on the Androscoggin river and the Maine Central and Grand Trunk railroads, 30 miles S. W. of Augusta. The river, which separates Auburn from the city of Lewiston, has a fall of 60 feet near the cities, giving them excellent power for manufacturing. Auburn is principally engaged in the manufacture of shoes, though it is doing considerable in the lines of cotton goods, furniture, and tanned leather. It is lighted by electricity, and has 1 Na-

tional bank, a high school, and public library. Pop. (1910) 15,064; (1920) 16,985.

AUBURN, city and county-seat of Cayuga co., N. Y.; on the outlet of Owasco Lake and the New York Central and Hudson River and the Lehigh Valley railroads; 174 miles W. of Albany. The city is an important industrial center, its principal manufactures being reapers, mowers, binders, threshing machines and other agricultural implements, carpets, cotton, woolen and iron goods, and shoes, for which the lakes provide excellent power. It is the seat of the Auburn Theological Seminary (Presb.), founded in 1821; a large State prison, a prison for women, and a State armory. There are also about 25 churches, an Academic High School, Academy of Music, 2 National banks, hospital, orphan asylum, several public libraries and daily and weekly newspapers. Among its public attractions is a statue of the late William H. Seward, who lived here. Pop. (1910) 34,668; (1920) 36,192.

AUBURN THEOLOGICAL SEMINARY, a Presbyterian institution in Auburn, N. Y.; organized in 1820; at the close of 1919 had 13 professors and instructors; 45 students; number of graduates, 1,616; president, Rev. G. B. Stewart, D. D.

AUCH (ōsh), an ancient town of France; capital of the department of Gers; on the Gers river; 43 miles S. of Agen. In the time of Cæsar's invasion it was the capital of the Ausci or Auscii. It contains an archbishop's palace, a Gothic cathedral, public library, royal college, museum of natural science and a town hall. It is also noted for its manufactures of cotton stuffs, leather, linen, etc. Pop. about 14,000.

AUCHENIA, a genus of mammalia of the order *ruminantia* and the family *camelidæ*. It includes the llamas, which are the American representatives of the camels so well known in the Eastern world. They have no dorsal humps, and their toes are completely divided. There are about four species of auchenia: the *A. guanaco*, or guanaco; the *A. glama*, or llama; the *A. paco*, the paco or alpaca; and the *A. vicunia*, or vicuna.

AUCHTERARDER, a town in Perthshire, Scotland, with manufactures of tweeds, tartans, etc. The opposition to the presentee to the church of Auchterader (1839) originated the struggle which ended in the formation of the Free Church of Scotland.

AUCKLAND, a town in New Zealand, in the North Island, founded in 1840, and situated on Waitemata harbor, one of the finest harbors of New Zealand, where the island is only 6 miles across, there being another harbor (Manukau) on the opposite side of the isthmus. It is about 1,300 miles from Sydney, 1,650 miles from Melbourne, and 5,440 miles from San Francisco. The harbor has two good entrances, with lighthouse; and is defended by batteries. There are numerous wharves and jetties, and a couple of graving docks, one of which—the Calliope dock, opened in 1887—is one of the largest in the whole of the Southern Seas. Its site is picturesque, the streets are spacious and the public buildings, including a university college, are numerous and handsome. It has a large and increasing trade. It was formerly the capital of the colony. Pop., including suburbs, about 125,000. The provincial district of Auckland forms the northern part of North Island, with an area of 25,746 square miles; the surface is very diversified; volcanic phenomena are common, including geysers, hot lakes, etc.; rivers are numerous; wool, timber, kauri-gum, etc., are exported. Much gold has been obtained in the Thames Valley and elsewhere.

AUCKLAND, WILLIAM EDEN, LORD, an English statesman, born April 3, 1744; educated at Eton and Oxford; called to the bar, 1768; Under-Secretary of State 1772, and in 1776 Lord of Trade. In 1778 he was nominated, in conjunction with Lord Howe and others, to act as mediator between Great Britain and the insurgent American colonies. He was afterward Secretary of State for Ireland, Ambassador Extraordinary to France, Ambassador Extraordinary to the Netherlands. He was raised to the peerage in 1788, and died May 28, 1814.

AUCKLAND ISLANDS, a group lying in the Pacific Ocean to the S. of New Zealand. The largest of these islands is about 30 miles long by 15 broad, and is covered with dense vegetation. They are almost entirely uninhabited, belong to the British and are a station for whaling ships.

AUCTION, the public disposal of goods to the highest bidder. None but those who have taken out an auction license are at present allowed to conduct such sales. The goods may be put up at a low figure, and then competitors for them bidding against each other will raise this to a higher price. This is what is generally done. In what is called a "Dutch auction," however, the process

is reversed. The goods are put up at a price much above their value, and gradually lowered till a bid is given for them, and they are then forthwith knocked down to the one from whom it proceeded.

AUCUBA, a genus of plants belonging to the order *cornaceæ*, or cornels, The only known species is *A. japonica*, a well known evergreen, with leaves like those of the laurel in form and mottled with yellow.

AUDE (ōd), a maritime department in the S. of France; area, 2,438 square miles; mainly covered by hills belonging to the Pyrenees or the Cevennes, and traversed W. to E. by a valley drained by the Aude. The loftier districts are bleak and unproductive; the others tolerably fertile, yielding good crops of grain. The wines, especially white, bear comparison with any. Pop. about 300,000.

AUDIOMETER, or **AUDIMETER**, an instrument devised by Professor Hughes, the inventor of the microphone. Originally its object was to measure with precision the sense of hearing. Among its constituent parts are an induction coil, a microphone key and a telephone. The audiometer has been materially modified, and is now principally used for obtaining a balance of induction from two electric coils acting upon a third one. A scale is provided to show the extent of the movement.

AUDIPHONE, an invention to assist the hearing of deaf persons, in whom the auditory nerve is not entirely dsetroyed. The instrument, made of a thin sheet of ebonite rubber or hard vulcanite, is about the size of a palm leaf fan, with a handle and strings attached to bend it into a curving form, and a small clamp for fixing the string at the handles. The audiphone is pressed by the deaf person using it against his upper front teeth, with the convex side outward; when so placed it communicates the vibrations caused by musical sounds or articulate speech to the organs of hearing.

AUDIT, an examination into accounts or dealings with money or property, along with vouchers or other documents connected therewith, especially by proper officers, or persons appointed for the purpose. Also the occasion of receiving the rents from the tenants on an estate.

AUDITORY, pertaining to the organs of hearing.

AUDUBON, JOHN JAMES, an American naturalist of French extraction, born near New Orleans, May 4, 1780; was educated in France, and studied painting under David. In 1798 he settled in Pennsylvania, but, having a great love for ornithology, he set out in 1810 with his wife and child, descended the Ohio, and for many years roamed the forests in every direction, drawing the birds which he shot. In 1826 he went to England, exhibited his drawings in Liverpool, Manchester, and Edinburgh, and finally published them in an unrivalled work of double-folio size, with 435 colored plates of birds, the size of life ("The Birds of America," 4 vols., 1827-1839), with an accompanying text ("Ornithological Biography"). On his final return to the United States he labored with Dr. Bachman on an illustrated work entitled "The Quadrupeds of America" (1843-1850, 3 vols.). He died in New York City, June 27, 1851.

AUERBACH, BERTHOLD (ou'er-bäch), a German novelist, born at Nordstetten, Württemberg, Feb. 28, 1812; began to write while a student in Heidelberg, and under the pseudonym "THEOBALD CHAUBER" produced a "Biography of Frederick the Great" (1834-1836). A series of novels from the history of Judaism, under the collective title "The Ghetto," of which "Spinoza" (1837) and "Poet and Merchant" (1839) were printed in separate editions, was followed by a translation of Spinoza, with a critical biography (1841); and by "The Educated Citizen: a Book for the Thinking Human Mind" (1842). His next work, "Black Forest Village Stories" (1843), was translated into nearly all European languages and established his fame. To this class of tales belong also "The Professor's Lady" (1847); "Joseph in the Snow" (1860); "After Thirty Years" (1876). "On the Heights" (1865) constituted the crowning success of his literary career. It was followed by the "Villa on the Rhine" (1868) and "The Head Forester" (1879). He died at Cannes, France, Feb. 8, 1882.

AUERSTÄDT (ou'er-stedt), a village in the Prussian province of Saxony, 10 miles W. of Naumburg. It is famous for the great battle which took place there Oct. 14, 1806, between the French under Davoust, and the Prussian army under Duke Charles of Brunswick, which ended in a great victory for the former. Napoleon, who had, on the same day, defeated the main army of Frederick William II. at Jena, made Davoust Duke of Auerstädt.

AUGEREAU (ōzh-rō'), **PIERRE FRANÇOIS CHARLES, DUKE OF CASTIGLIONE**, a celebrated French general,

born at Paris in 1757. He joined the army as a private soldier, proceeded to Spain, and soon rose to the rank of adjutant-general. He then took high command under Napoleon I. in Italy, and in 1796, at the head of his own brigade, stormed the bridge of Lodi. To him Napoleon owed the brilliant victories of Castiglione and Arcole. Augereau having been sent by Napoleon to Paris became military commander of the capital, and led the *coup d'état*, or Revolution of Fructidor, by which the enemies of the Directory were seized and overthrown. Appointed to the command of the army on the German frontier, he became so wildly democratic that the Directory displaced him and sent him to Perpignan. He refused to assist Napoleon in the revolution which preceded the consulate and the empire. In 1805, being created a Marshal of France, Augereau commanded at the reduction of the Vorarlberg; was at the battle of Jena in 1806, and accompanied Napoleon to Berlin. He commanded the French at Eylau in 1807, and, in 1809 and 1810, commanded in Catalonia, where he committed great excesses. Augereau was at the great battles of Leipsic, Oct. 16, 17, and 18, 1813, and in 1814, commanded at Lyons, to repel the march of the Austrians from that direction on the capital. Yielding to superior numbers, he retired to the S. and displaying little attachment to Napoleon, acknowledged the Bourbons, retained his honors, and became a peer. He died in June, 1816.

AUGIER, GUILLAUME VICTOR EMILE (ōzh-yā'), a French dramatic poet, born at Valence, Sept. 20, 1820. "La Ciguë," his first play (1844), was accepted by the managers of the Odéon Théâtre and established the popularity of the author. "Gabrielle," a five-act comedy, has been pronounced Augier's most finished and best constructed work, whether as regards plot, poetry or the delineation of character. He was nominated a member of the Académie Française, and then officer of the Legion of Honor. At the solicitation of Mlle. Rachel, Augier wrote "Diane," a piece in five acts. In 1868 his "Fils de Giboyer" had a great success. He may be said to have founded a new school in French dramatic literature. He died Oct. 25, 1889.

AUGITE, an important mineral, interesting from its geological as well as its mineralogical relations. Dana applies the name to the greenish or brownish-black and black kinds of aluminous pyroxene, found chiefly in eruptive, but sometimes also in metamorphic, rocks. When altered into hornblende it is called tralite. Augite was once suspected by many mineralogists to be essentially the same mineral as hornblende, differing only in this respect, that the former species resulted from rapid and the latter from slow cooling. But Dana separates the two, regarding hornblende as an aluminous variety of amphibole and not of pyroxene. Both are found in modern and in ancient volcanic products.

AUGSBURG (ougs-pörg), a city of south Germany, capital of Suabia, in the former Kingdom of Bavaria. It is situated on a large and fertile plain watered by the rivers Wertach and Lech, 35 miles N. W. of Munich. Augsburg was for ages one of the richest, most commercial and powerful of the free cities of the German Empire. Among noted buildings are the cathedral, arsenal, Abbey of St. Ulric, and the town hall, one of the finest edifices in Germany. Augsburg's greatest commercial importance arose from its being, next to Frankfort, the chief seat of banking and exchange operations in central Europe. A large trade is carried on in engraving, printing and bookselling. Augsburg was once of much greater population and importance than it is at present. It was founded by the Roman Emperor Augustus, 12 B. C. In the Middle Ages it became early distinguished for its trade, and in the 14th, 15th, and 16th centuries attained to almost regal power and opulence. Augsburg has been the theater of many memorable events. In addition to the proceedings of the Diet, with respect to the memorable confession of faith, there, in 1530, was concluded the peace which guaranteed the full enjoyment of their rights and liberties to the Protestants. Augsburg continued to be a free city until 1806, when Napoleon ceded it to Bavaria. Pop. about 125,000.

AUGSBURG, CONFESSION OF, the name given to the celebrated declaration of faith, compiled by Melanchthon, and revised by Luther and other reformers, which was read before the Diet of Augsburg, June 25, 1530. It consisted of 28 articles, seven of which contained refutations of Roman Catholic errors, and the remaining 21 set forth the leading tenets of the Lutheran creed. Soon after its promulgation, the last hope of inducing the Pontiff to reform the Roman Catholic Church was abandoned, and the complete severance of the connection followed. An answer by the Roman Catholics was read Aug. 3, 1530; when the Diet declared that it had been refuted. Melanchthon then drew up a somewhat different confession. The first is called the unaltered, the second the altered confession.

AUGSBURG, DIET OF, the most celebrated of the numerous diets, or parliaments, held at Augsburg, convened in 1530. Pope Clement VII. refusing to call a general council for the settlement of all religious disputes, the Emperor Charles V. summoned another diet at Augsburg, which met on June 20, 1530. On the 25th the famous "Confession" was read, and on Aug. 3 an answer was made by the Roman Catholics, whereupon it was proclaimed that the Protestants must conform in all points to the Church of Rome. Charles V. soon after delivered his decision, in which he gave the Protestants till April 15, 1531, to reunite themselves to the Mother Church. The Emperor engaged to induce the Pope to summon a national or general council and later announced his intention to execute the edict of Worms, made some severe enactments against the Protestants, and reconstituted the Imperial Chamber.

AUGSBURG, LEAGUE OF, a league entered into and concluded at Augsburg, July 9, 1686, for the maintenance of the treaties of Münster and Nimeguen, and the truce of Ratisbon. It was negotiated by William, Prince of Orange, on June 21, in the above year, for the purpose of resisting the encroachments of France. The contracting parties were the Emperor Leopold I., the Kings of Spain and Sweden, the Electors of Saxony and Bavaria, and the Circles of Suabia, Franconia, Upper Saxony and Bavaria. The league was to be in force for three years, and might then be renewed. England acceded to it in 1689.

AUGUST, the name given to the eighth month of our year. It was named B. C. 30, by the Roman Emperor Augustus, after himself, as he regarded it as a fortunate month for him, being that in which he had gained several important victories. Before this time it was called Sextilis, or the sixth month, the year beginning with March. The name of July had, in like manner, been Quintilis, before it was changed by Julius Cæsar; and as it contained 31 days, the Senate, in order that Augustus might not be behind Cæsar, decreed that August also should have 31 days, and that, for this purpose, a day should be taken away from February.

AUGUSTA, or **AGOSTO**, a fortified city of Sicily, 11 miles N. of Syracuse by rail. It stands on a rocky islet joined by a bridge to a peninsula projecting into the Mediterranean, and is near the site of the Megara Hyblæa of the ancients. The port is spacious, but of rather difficult access. Salt, oil, wine, cheese, fruit, honey, grain, and sardines are exported. Pop. about 16,000. Near it was fought in 1676 a great naval battle between the French under Duquesne, and a Spanish and Dutch fleet under the famous Admiral De Ruyter. The latter was defeated, and received a wound of which he died at Syracuse.

AUGUSTA, city, and county-seat of Richmond co., Ga.; on the Savannah river, and numerous railroads; 120 miles N. W. of Savannah. The site is about 700 feet above sea-level, and the city has an even temperature and a dry, invigorating atmosphere. The city is laid out with broad streets which intersect at right angles, and many of them are beautifully shaded with trees. The city hall is in a park which also contains a granite monument in memory of the Georgia signers of the Declaration of Independence, and an imposing monument to the Confederate dead of the State has been erected on Broad street, the principal thoroughfare of the city. The city has several parks, and a United States arsenal, and in the suburbs are Summerville, a noted health resort, the principal cemetery, and attractive fair grounds. Augusta has a large trade in cotton, lumber, fruit and vegetables, but its main importance is in its manufacturing enterprises. The principal industrial plants are cotton mills. The city is the seat of the Medical College of Georgia, and has an orphan asylum, public hospitals, the Louise King Home, a juvenile reformatory, several National and State banks, and several daily and weekly periodicals. Pop. (1910) 41,040; (1920) 52,548.

AUGUSTA, city, capital of the State of Maine, and county-seat of Kennebec co.; on the Kennebec river, and the Maine Central railroad; 63 miles N. E. of Portland. The city is built on both sides of the river on a series of terraces, the principal part being on the W. bank. It was first permanently settled by traders from Massachusetts in 1754; was incorporated under the name of Hallowell, in 1771; was reduced by the setting off of Hallowell in 1797; became the capital of the State in 1831; and received a city charter in 1849. In the State House is the State library, a notable collection of portraits of American statesmen, and, in the rotunda, an impressive array of the Civil War battle flags of the Maine Volunteers. In the principal park is a Soldiers' and Sailors' monument. On the E. side of the river are the State Asylum for the Insane, and United States arsenal. Four miles from Augusta is a National Soldiers'

Home. The principal manufactures, which are promoted by an abundant water power, are cotton goods, paper, wood pulp, and lumber. The city is lighted by electricity, and has electric street railways, several National banks, high school, Lithgow Public Library, a number of weekly periodicals, etc. Pop. (1910) 13,211; (1920) 14,114.

AUGUSTA, a title first given to his wife Livia, after the death of Augustus, according to the will of the emperor. It was afterward conferred by Claudius on Agrippina (A. D. 51), and by Nero on his wife Poppæa, as well as her daughter (A. D. 64). Eventually it became a common title of the mother, wife, sister, or daughter of an emperor.

AUGUSTA VICTORIA, Duchess of Schleswig-Holstein-Sonderburg-Augustenburg, born Oct. 22, 1858; daughter of the late Duke Friedrich; married Prince Friedrich Wilhelm, afterward Wilhelm II., Feb. 27, 1881; became Empress of Germany and Queen of Prussia on the accession of her husband to the thrones in June, 1888. She has borne the former Emperor-King seven children, the former Crown Prince, Friedrich Wilhelm, being born May 6, 1882. She is the author of a book of reminiscences of her travels in Palestine with the former Emperor in 1898. After the Emperor's flight to Holland in November, 1918, she joined him a little later and has since shared his exile.

AUGUSTINE (a'gus-tēn), **AURELIUS AUGUSTINUS, ST.**, a renowned father of the Christian Church, was born at Tagaste, in Africa, in 354, his mother, Monica, being a Christian, his father, Patricius, a pagan. His parents sent him to Carthage to complete his education, but he disappointed their expectations by leading a life of pleasure. A book of Cicero's led him to study philosophy; but dissatisfied with this, he joined the Manichæans. He left them after nine years and went to Rome and then to Milan. Here St. Ambrose, bishop of the city, and the reading of St. Paul converted him to the Christian faith. After preparation for baptism he received it from Ambrose, being then in his 33d year. He returned to Africa, sold his property, giving the proceeds to the poor, and became assistant to the bishop of Hippo, succeeding to the see in 395. Of his various works his "Confessions" is most secure of immortality. He died Aug. 28, 430, while Hippo was besieged by the Vandals. He was a man of great enthusiasm, self-devotion, zeal for truth, and powerful intellect, and, though there have been fathers of the Church more learned, none have wielded a more powerful influence. His writings are partly autobiographical, partly polemical, homiletic, or exegetical. The greatest is the "City of God" ("De Civitate Dei"), a vindication of Christianity.

AUGUSTINE, or AUSTIN, ST., the Apostle of the English, flourished at the close of the 6th century, was sent with 40 monks by Pope Gregory I. to introduce Christianity into Saxon England, and was kindly received by Ethelbert, King of Kent, whom he converted, baptizing 10,000 of his subjects in one day. In acknowledgment of his tact and success Augustine received the archiepiscopal pall from the Pope, with instructions to establish 12 sees in his province, but he could not persuade the British bishops in Wales to unite with the new English Church. He died in 604 or 605.

AUGUSTINIANS, or AUGUSTINES, members of several monastic fraternities who follow rules framed by the great St. Augustine or deduced from his writings, of which the chief are the Canons Regular of St. Augustine, or Austin Canons, and the Begging Hermits or Austin Friars. The Austin Canons were introduced into Great Britain about 1100. They took the vows of chastity and poverty, and their habit was a long, black cassock with a white rochet over it. The Austin Friars, originally hermits, went barefooted, and formed one of the four orders of mendicants. An order of nuns had also the name of Augustines. Their garments, at first black, were latterly violet.

AUGUSTULUS, ROMULUS, the last of the Western Roman emperors; he reigned during one year only (475-476), when he was overthrown by Odoacer and banished.

AUGUSTUS CAIUS JULIUS CÆSAR OCTAVIANUS, originally called Caius Octavius, Roman Emperor, was the son of Caius Octavius and Atia, a daughter of Julia, the sister of Julius Cæsar. He was born 63 B. C., and died 14 A. D. Octavius was at Apollonia, in Epirus, when he received news of the death of his uncle (44 B. C.), who had previously adopted him as his son. He returned to Rome to claim Cæsar's property and avenge his death, and now took, according to usage, his uncle's name, with the surname Octavianus. He was aiming secretly at the chief power, but at first he joined the republican party, and assisted at the defeat of Antony at Mutina. He got himself chosen consul in 43. Soon after the first triumvirate was formed between

him and Antony and Lepidus, and this was followed by the conscription and assassination of 300 senators and 2,000 knights of the party opposed to the triumvirate. Next year Octavianus and Antony defeated the republican army under Brutus and Cassius at Philippi. The



THE STATUE OF THE EMPEROR AUGUSTUS

victors now divided the Roman world between them, Octavianus getting the West, Antony the East, and Lepidus Africa. Sextus Pompeius, who had made himself formidable at sea, had now to be put down; and Lepidus was deprived of all authority (36 B. C.) and retired into private life. Antony and Octavianus now shared the empire between them; but while the former, in the East, gave himself up to a life of luxury, and alienated the Romans by his alliance with Cleopatra, Octavianus skillfully cultivated popularity, and soon declared war ostensibly against the Queen of Egypt. The naval victory of Actium, in which the fleet of Antony and Cleopatra was defeated, made Octavianus master of the world, 31 B. C. He returned to Rome 29 B. C. Gradually all the highest offices of state, civil and religious, were united in his hands, and the new title of Augustus was also assumed by him, being formally conferred by the Senate in 27 B. C. Under him successful wars were carried on in Africa and Asia (against the Parthians), in Gaul and Spain, in Pannonia, Dalmatia, etc.; but the defeat of Varus by the Germans under Arminius with the loss of three legions, A. D. 9, was a great blow to him in his old age. Many useful decrees proceeded from him, and various abuses were abolished. He adorned Rome in such a manner that it was said, "He found it of brick, and left it of marble." He was a patron of literature; Vergil and Horace were befriended by him, and their works and those of their contemporaries are the glory of the Augustan Age. His death, which took place at Nola, plunged the empire into the greatest grief. He was thrice married, but had no son, and was succeeded by his stepson Tiberius.

AUGUSTUS I., Elector of Saxony, born 1526. During a peaceful reign he greatly beautified Dresden, his capital, and built the palace of Augustenburg. Died 1586.

AUGUSTUS II., Elector of Saxony, and King of Poland, born at Dresden in 1670. On account of his enormous muscular power, he was surnamed the Iron-handed, and the Strong. He succeeded his older brother in 1694, and commanded an expedition against the Turks. Owing to the death of John Sobieski, in 1696, the throne of Poland became vacant, and Augustus, after many intrigues, was proclaimed King in 1697. He then formed an alliance with Peter the Great against Charles XII. of Sweden, but the latter hero defeated Augustus in a sanguinary battle at Pultusk, penetrated to Warsaw, and there caused Stanislaus Lecszinski to be elected King of Poland, in place of Augustus. A long war followed, without advantage to Augustus, until the overthrow of Charles, at Pultowa, which event replaced him on the throne. The Poles regarded him as a foreigner and a usurper, and as the mere vassal of Russia. Augustus died in 1733.

AUGUSTUS III., Elector of Saxony, and King of Poland, born at Dresden, 1696, was the son of Augustus II. He was an indolent, idle, and pleasure-seeking prince, and his politics were entirely dependent on Russia. His daughter, Maria Josepha, was married to the Dauphin of France, from which alliance sprang Louis XVI., Louis XVIII., and Charles X. Died in 1763.

AUK, the name given to several sea birds, especially the great and the little auk. The great auk is the *alca impennis* of Linnæus. Its bones left behind show that it was formerly abundant on the shores of Iceland, Greenland and Denmark. The little auk of Pennant and

others, called also the common rotche, and the little white and black diver is *the mergulus melanoleucos* of Yarrell's "British Birds," the *M. alle* of Carpenter and Dallas, and the *alca alle* of Linnæus. It has the breast, the belly, a dot above the eyes, and a stripe on the wing, white; the rest of the plumage black. Its length is 9 inches, and the extent of its wings 16. Its dimensions are thus about those of a large pigeon. It nestles in holes or crevices on the bare rocks, laying one bluish-green egg. It is abundant in the Arctic seas. It is found also in Great Britain.

AULD LANG SYNE (awld läng zīn), a Scottish phrase meaning, literally "old long since"; hence the times of long ago, etc.

AULD REEKIE, an epithet or sobriquet applied to Edinburgh, on account of its smoky appearance as seen from a distance; or, as some say, on account of the former uncleanliness of its public thoroughfares; a reproach now, happily, without relevancy.

AULIC, name given to a council (the Reichshofrath) in the old German Empire, one of the two supreme courts of the German Empire, the other being the court of the imperial chamber (Reichskammergericht.) The title is now applied in Germany in a general sense to the chief council of any department, political, administrative, judicial, or military.

AULIS, in ancient Greece, a seaport in Bœotia, on the strait called Euripus, between Bœotia and Eubœa.

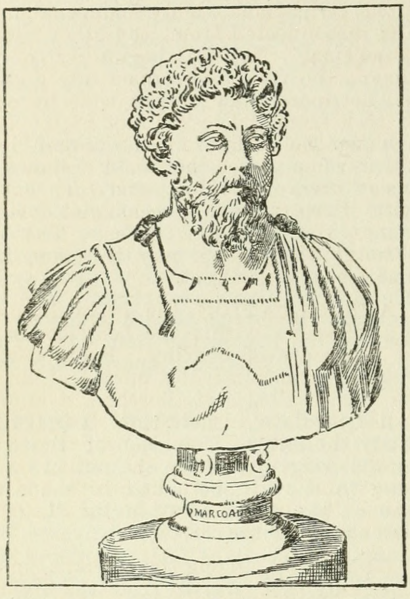
AUMALE (ō-mäl′), a small French town, in the department of Seine-Inférieure, 35 miles N. E. of Rouen, which has given titles to several notables in French history. JEAN D'ARCOURT, eighth Count d'Aumale, fought at Agincourt, and defeated the English at Gravelle (1423). CLAUDE II., Duc d'Aumale, one of the chief instigators of the Massacre of St. Bartholomew, was killed 1573. CHARLES DE LORRAINE, Duc d'Aumale, was an ardent partisan of the League in the politico-religious French wars of the 16th century. HENRI EUGENE PHILIPPE LOUIS D'ORLEANS, Duc d'Aumale, son of Louis Philippe, King of the French, was born in Paris, Jan. 16, 1822. In 1847 he succeeded Marshal Bugeaud as Governor-General of Algeria, where he had distinguished himself in the war against Abd-el-Kader. After the Revolution of 1848 he retired to England; but he returned to France in 1871, and was elected a member of the Assembly; became Inspector-general of the army in 1879, and was expelled, along with the other royal princes, in 1886. The same year he presented to the Institute of France his grand Chantilly estate, with all its priceless art and historical treasures. The decree of banishment was revoked on the fall of Boulanger, and the Duke returned to Chantilly. He published a "History of the House of Condé." He died in Zucco, Sicily, May 6, 1897.

AURANTIACEÆ (â-ran-tē-as′ē-ī), an order of plants, classed by Lindley in his *rutales*, or rutal alliance. They have from three to five petals, stamina the same in number, or twice as many, or some multiple of the petals, hypogynous. The fruit is pulpy, and is many-celled. There is no genus aurantium. The typical one is citrus, which contains the orange, the lemon, the lime, etc. There are about 95 known species, all from India.

AURELIAN, LUCIUS DOMITIUS AURELIANUS, Emperor of Rome, of humble origin, was born about 212 A. D., rose to the highest rank in the army, and on the death of Claudius II. (270) was chosen Emperor. He delivered Italy from the barbarians (Alemanni and Marcomanni), and conquered the famous Zenobia, Queen of Palmyra. He followed up his victories by the reformation of abuses, and the restoration throughout the empire of order and regularity. He lost his life, A. D. 275, by assassination, when heading an expedition against the Persians.

AURELIUS ANTONINUS, MARCUS, often called simply MARCUS AURELIUS, Roman Emperor and philosopher, son-in-law, adopted son, and successor of Antoninus Pius, born A. D. 121, succeeded to the throne 161; died 180. His name originally was Marcus Annius Verus. He voluntarily shared the government with Lucius Verus, whom Antoninus Pius had also adopted. A war with Parthia broke out in the year of his accession, and did not terminate till 166. A confederacy of the northern tribes now threatened Italy, while a frightful pestilence, brought from the East with the army, raged in Rome itself. Both emperors set out in person against the rebellious tribes. In 169 Verus died, and the sole command of the war devolved on Marcus Aurelius, who prosecuted it with the utmost rigor, and nearly exterminated the Marcomanni. His victory over the Quadi (174) is connected with a famous legend. Dion Cassius tells us that the 12th legion of the Roman army was shut up in a defile, and reduced to great straits for want of water, when a body of Christians enrolled in the le-

gion prayed for relief. Not only was the rain sent, which enabled the Romans to quench their thirst, but a fierce storm of hail beat upon the enemy, which so



MARCUS AURELIUS

terrified them that a complete victory was obtained, and the legion was ever after called "The Thundering Legion." After this victory, the Marcomanni, the Quadi, as well as the rest of the barbarians, sued for peace. Aurelius returned to Rome, after visiting Egypt and Greece, but soon new incursions of the Marcomanni compelled him once more to take the field. He defeated the enemy several times, but was taken sick at Sirmium, and died at Vindobona (Vienna) in 180. His only extant work is the "Meditations," written in Greek, and which has been translated into most modern languages.

AUREUS, the first gold coin which was coined at Rome, 207 B. C. Its value varied at different times, from about $3 to $6.

AURICHALCITE, a mineral placed by Dana under the fourth section of his hydrous carbonates. It occurs in acicular crystals, forming drusy incrustations; also columnar, plumose, granular, or laminated. Its luster is pearly; its color, pale-green, or sometimes azure. It is found in England at Roughten Gill, in Cumberland; at Leadhills, in Lanarkshire; in Spain, Asia, and the United States. Buratite, by some called lime-aurichalcite, occurs in France and in Austro-Hungary.

AURICULA, a well known and beautiful garden flower, the *primula auricula*. It is a native of the Alpine districts of Italy, Switzerland, and Germany, and occurs also in Astrakhan. In its wild state its colors are generally yellow and red, more rarely purple, and occasionally variegated or mealy. A still greater variety of colors has been introduced by cultivation. In zoölogy, a genus of pulmoniferous mollusks, the typical one of the family *auriculidæ*. They are found chiefly in the brackish swamps of tropical islands.

AURIFABER, the Latinized name of JOHANN GOLDSCHMIDT, one of Luther's companions, born in 1519, became pastor at Erfurt in 1566; died there in 1579. He collected the unpublished manuscripts of Luther, and edited the "Epistolæ" and the "Table-Talk."

AURIGA (â-rē'ga), in astronomy, the Wagoner, a constellation of the northern hemisphere, containing 68 stars, including Capella of the first magnitude.

AURILLAC (ō-rē-yak), a town of France, capital of the department of Cantal; on the Jordanne river; 272 miles S. of Paris. It is noted for its ancient buildings, among which are the Church of Notre Dame, constructed in the 13th century, and the castle of St. Stephen. Most of the town is of modern construction. It has manufactures of jewelry, copper, kettles, paper, woolen stuffs and carpets. Pop. about 18,000.

AURINGER, OBADIAH CYRUS, an American poet, born at Glens Falls, N. Y., June 4, 1849. He served for some years in the United States navy. In 1875 he became a farmer in his native place. Among his works are "Scythe and Sword" (1887); "Episode of Jane McCrea," "The Book of the Hills," "Eagle Bride" (1911), etc.

AUROCHS, the English and very nearly the German name of the *aurochs fossile* of Cuvier, the *bos irus* of some other writers, now called *bison priscus*. It belongs to the order *ruminantia* and the family *bovidæ*. It is a species of ox, with a shaggy coat and mane, found by the Romans in the forests of Germany and Belgium, and still existing in small numbers in Lithuania.

AURORA, a city in Kane co., Ill., on the Fox river, and the Chicago and Northwestern, the Burlington Route, and other railroads; 38 miles W. of Chicago. It contains several locomotive, car, and

railroad repair shops; large cotton and woolen mills; watch and carriage factories; smelting and silver plating works; stove and machine works; and other industries. It is the farming and manufacturing center for Kane and adjoining counties. It has churches, State hospital, Aurora College, electric light and street railway plants, water works, National banks, and daily and weekly newspapers. Pop. (1910) 29,807; (1920) 36,265.

AURORA BOREALIS, a luminous meteoric phenomenon appearing in the N., most frequently in high latitudes, the corresponding phenomenon in the southern hemisphere being called aurora australis, and both being also called polar light, streamers, etc. The northern aurora has been far the most observed and studied. It usually manifests itself by streams of light ascending toward the zenith from a dusky line of cloud or haze a few degrees above the horizon, and stretching from the N. toward the W. and E., so as to form an arc with its ends on the horizon, and its different parts and rays are constantly in motion. Sometimes it appears in detached places; at other times it almost covers the whole sky. It assumes many shapes and a variety of colors, from a pale red or yellow to a deep red or blood color; and in the northern latitudes serves to illuminate the earth and cheer the gloom of the long winter nights. The appearance of the aurora borealis so exactly resembles the effects of artificial electricity that there is every reason to believe that their causes are identical. The aurora borealis is frequently accompanied by sound, which is variously described as resembling the rustling of pieces of silk against each other, or the sound of wind against the flame of a candle. The aurora of the southern hemisphere is quite a similar phenomenon to that of the northern.

AURUNGZEBE (au-rung-zēb′), known as the Great Mogul, or Emperor of Hindustan, born Oct. 22, 1618. He was the son of Shah Jehan, and properly named Mohammed, but received from his grandfather that of Aurungzebe (Ornament of the Throne). After deposing and imprisoning his father, and putting his brothers to death, Aurungzebe, in 1658, was crowned sole monarch of the great Mogul Empire. His long reign was more remarkable for its internal policy than for its outward events. Aurungzebe carried on many wars, conquered Golconda and Beejapur, and subjugated the Mahrattas. Aurungzebe died at Ahmednuggur, in the Deccan, Feb. 21, 1709, master of 21 provinces, and of a revenue of about $200,000,000.

AUSABLE CHASM, a picturesque and popular American summer resort, in New York State; 12 miles from Plattsburg, and 1 mile from Keeseville. It is an isolated formation, wholly independent of, and disconnected from, any other similar panorama. At the beginning of the chasm, the river is hemmed into a channel not more than 10 feet wide by walls of rock from 100 to 200 feet high. Lower down the walls gradually spread apart till in some places there is a distance between them of 50 feet, and then extend with sharp turns and occasional enlargements for nearly 2 miles. The trip through the chasm may be made in a small boat or on foot.

AUSCULTATION, the art of discovering diseases within the body by means of the sense of hearing. Being carried out most efficiently by means of an instrument called a stethoscope, it is often called mediate auscultation. It is used to study the natural sounds produced within the body, especially the action of the lungs and heart, both in health and disease. Its operation can be facilitated by percussion of the surface.

AUSPICES, among the Romans, omens, especially those drawn from the flight or other movements of birds, or, less properly, from the occurrence of lightning or thunder in particular parts of the sky. These were supposed to be indications of the will of heaven, and to reveal futurity. At first only the augurs took the auspices, but after a time civil officers, discharging important functions, had the right of doing so. Two kinds of auspices, however, arose—a greater and a lesser; the former reserved to dictators, consuls, censors, prætors, or the commander-in-chief in war; the latter permitted to less exalted functionaries. The glory of a successful enterprise was universally assigned to the person who took the auspices, and not to the leader of the enterprise itself; hence, the phrase arose, to carry on a war "under the auspices" of the Emperor or some other high authority.

AUSTEN, JANE, an English novelist, born at Stevenson, Hampshire, of which parish her father was the rector, Dec. 16, 1775. She was the youngest of seven children, among whom she had but one sister, and of her brothers two ultimately rose to the rank of Admiral in the navy. Jane learned French and Italian, and had a good acquaintance with English literature, her favorite authors being Richardson, Johnson, Cowper, Crabbe, and later, Scott. In 1801 she went with her family to Bath, and after her father's death in 1805, removed to Southampton,

and, finally, in 1809, to Shawton, near Winchester. She had written stories from her childhood, but it was here she first gave anything to the world. Four stories were published anonymously during her lifetime: "Sense and Sensibility" (1811); "Pride and Prejudice" (1813); "Mansfield Park" (1814), and "Emma" (1816). The first two were written before the gifted authoress was more than two-and-twenty years old. Early in 1816, her health began to give way. In May, 1817, she went for medical advice to Winchester, and there she died, July 18, 1817. She was buried there in the Cathedral. "Northanger Abbey" and "Persuasion" were published in 1818, when the authorship of the whole six was first acknowledged. Jane Austen's novels are the earliest example of the so-called domestic novel in England. The finest critics, with singular unanimity, have praised the delicacy of her touch, and her faultless work has called forth the most unqualified admiration from Southey, Coleridge, Sydney Smith, and Lord Macaulay.

AUSTERLITZ, a small town of Moravia, on the Littawa, 13 miles S. E. of Brünn. In the vicinity, on Dec. 2, 1805, was fought the famous battle that bears its name, between the French army of 65,000 men, commanded by Napoleon, and the combined Russian and Austrian armies, numbering 89,000, under their respective Emperors; in which the former achieved a signal victory. The battle was followed by an armistice, the terms of which were dictated by Napoleon; and immediately after, on Dec. 26, by the Treaty of Pressburg, which disastrously affected Austria.

AUSTIN, a city of Minnesota, the county-seat of Mower co. It is on the Chicago, Milwaukee, and St. Paul, and the Chicago Great Western railroads, and on the Red Cedar river. The city is the seat of the Southern Minnesota University and has parks, a Carnegie library, a county court house, and other important public buildings. It is the center of a fertile agricultural community and has industries, including meat packing, flour mills, foundry, cement works, roller mills, etc. Pop. (1910) 6,960; (1920) 10,118.

AUSTIN, a city, capital of the State of Texas, and county-seat of Travis co.; on the Colorado river and the Houston and Texas Central, the International and Great Northern, the Missouri, Kansas, and Texas, and the Austin and Northwestern railroads; 230 miles N. W. of Galveston. It derives large power for manufacturing from the river, and the principal industries are the manufacture of oil, lumber, iron, flour, tanned leather, etc. Besides the State Capitol, the city contains the main buildings of the State University, State asylums, the State Confederate Home, and the State Land Office. The Capitol, which cost $3,000,000, is in a square of 10 acres, in which are also the Supreme Court and Treasury buildings. The river is here spanned by two bridges, and the recent construction of a dam in it has given the city a large and beautiful stretch of water known as Lake McDonald. This lake has become a favorite resort for fishing, hunting, and health-seeking parties, and is widely known from the facts that two international regattas have been rowed on it, and that Stanbury, of Australia, here won the championship of the world. The city was originally known as Waterloo; was named after Stephen F. Austin, in 1837; became the capital of the Republic of Texas in 1839; the capital of the State in 1872. Pop. (1910) 29,860; (1920) 34,876.

AUSTIN, ALFRED, an English poet, critic, and journalist, born at Headingly, near Leeds, May 30, 1835. He graduated from the University of London in 1853, was called to the bar in 1857, and was editor of the "National Review," 1883-1893. He was appointed poet laureate of England in 1896. He is the author of political books, novels and many volumes of verse. The latter include "The Human Tragedy" (1862); "The Tower of Babel," a drama (1874); "Savonarola," a tragedy (1881); and "Veronica's Garden," in prose and verse (1895); "Haunts of Ancient Peace" (1902); "A Lesson in Harmony" (1904). Died June 2, 1913.

AUSTIN, MARY HUNTER, an American writer, born in Carlinville, Ill., in 1868. She graduated from Blackburn University in 1888. In 1891 she married Stafford W. Austin. The scenes of her novels are mostly laid in California. She wrote "The Land of Little Rain" (1903); "The Flock" (1906); "The Basket Woman" (1904); "Love and the Soul-Maker" (1914); "The Ford" (1917); etc. She also wrote several plays.

AUSTIN, OSCAR PHELPS, an American statistician, born in Newark, Ill. He was educated in the public schools and for several years engaged in newspaper work. He was chief of the Bureau of Statistics of the Department of Commerce and Labor, and remained in this post until its transfer to the Bureau of Foreign and Domestic Commerce, of



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which he was made assistant chief. From 1903 to 1914 he was professor of commerce and statistics at George Washington University, and since 1914 statistician of the foreign trade department of the National City Bank. He was a member of several economic societies. He wrote "Uncle Sam's Secrets," "Uncle Sam's Soldiers," "Colonial Systems of the World," "Commercial Japan," "Commercial South and Central America," "Great Canals of the World," "Manufacturing Systems of the World," "Economics of World Trade," "International Commerce," and other works.

AUSTIN, STEPHEN FULLER, an American pioneer, born in Austinville, Va., Nov. 31, 1793; a son of Moses Austin, the real founder of the State of Texas, who, about 1820, obtained permission from the Mexican Government to establish an American colony in Texas, but died before his plans were accomplished. Stephen took up the work unfinished by his father, and located a thrifty colony on the site of the present city of Austin, in 1821. Subsequently he was a commissioner to urge the admission of Texas into the Mexican Union; was imprisoned there for several months; and in 1835 was a commissioner to the United States Government to secure the recognition of Texas as an independent State. He died in Columbia, Tex., Dec. 25, 1836.

AUSTRALASIA, a division of the globe usually regarded as comprehending the islands of Australia, Tasmania, New Zealand, New Caledonia, the New Hebrides, the Solomon Islands, New Ireland, New Britain, the Admiralty Islands, New Guinea, and the Arru Islands, besides numerous other islands and island groups; area, 3,470,000 square miles; pop. about 6,400,000. It forms one of three portions into which some geographers have divided Oceania, the other two being Malaysia and Polynesia.

AUSTRALIA (older name, New Holland), the largest island in the world, a sea-girt continent, lying between the Indian and Pacific Oceans, S. E. of Asia. It is separated from New Guinea on the N. by Torres Strait, from Tasmania on the S. by Bass Strait. It is divided into two unequal parts by the Tropic of Capricorn, and consequently belongs partly to the South Temperate, partly to the Torrid Zone. The Commonwealth consists of six colonies called the Original States of New South Wales, Victoria, Queensland, South Australia, Western Australia, and Tasmania. The act providing for a Federal Union constituting the Commonwealth was passed by the British Parliament in 1900. On Jan. 1, 1911, the north territory was transferred by South Australia to the Commonwealth, and on the same date a portion of New South Wales, consisting of 912 square miles, was vested in the Commonwealth for the purpose of forming the Federal Territory containing the seat of the Commonwealth Government. This area was increased in 1917 to 940 square miles.

Area and Population.—Their area and population in 1918 are given as follows:

	Sq. M.	Pop.
New South Wales	310,700	1,897,08[illegible]
Victoria	87,884	1,416,982
Queensland	668,497	705,588
South Australia	903,690	439,272
Western Australia	975,920	511,125

The population of the smaller divisions is as follows:

Tasmania, 202,842; Northern Territory, 3,269; Federal Territory, 2,404.

The estimated total population in 1919 was 5,140,543.

Sydney, the capital of New South Wales, Melbourne, the capital of Victoria, Adelaide, the capital of South Australia, and Brisbane, the capital of Queensland, are the chief towns.

Topography.—Although there are numerous spacious harbors on the coasts, there are few remarkable indentations; the principal being the Gulf of Carpentaria, on the N., the Great Australian Bight, and Spencer Gulf, on the S. The chief projections are Cape York Peninsula and Arnhem Land in the N. Parallel to the N. E. coast runs the Great Barrier Reef for 1,000 miles.

Geology.—The interior, so far as explored, is largely composed of rocky tracts and barren plains with little or no water. The whole continent forms an immense plateau, highest in the E., low in the center, and with a narrow tract of land usually intervening between the elevated area and the sea. The base of the table-land is granite, which forms the surface rock in a great part of the S. W., and is common in the higher grounds along the E. side. Secondary (cretaceous) and tertiary rocks are largely developed in the interior. Silurian rocks occupy a large area in South Australia, on both sides of Spencer Gulf. The mountainous region in the S. E. and E. is mainly composed of volcanic, silurian, carbonaceus, and carboniferous rocks yielding good coal. The highest and most extensive mountain system is a belt about 150 miles wide, skirting the whole eastern and southeastern border of the continent, and often called, in

whole, or in part, the Great Dividing Range, from forming the great water shed of Australia. A part of it, called the Australian Alps, in the S. E. contains the highest summits in Australia, Mt. Kosciusko (7,175 feet), Mt. Clark (7,256), and Mt. Townshend (7,353). West of the Dividing Range are extensive plains or downs admirably adapted for pastoral purposes. The deserts and scrubs, which occupy large areas of the interior, are a characteristic feature of Australia.

Water Courses.—The chief river is the Murray, which, with its affluents, the Murrumbidgee, Lachlan, and Darling, drains a great part of the interior W. of the Dividing Range, and falls into the sea on the S. coast (after entering Lake Alexandrina). Its greatest tributary is the Darling, which may even be regarded as the main stream. On the E. coast are the Hunter, Clarence, Brisbane, Fitzroy, and Burdekin; on the W. the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the N. the Fitzroy, Victoria, Flinders, and Mitchell. The Australian rivers are of little service in facilitating internal communication. A considerable river of the interior is Cooper's Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the S. side of the continent having no outlet, and, accordingly, salt. The principal of these are Lakes Eyre, Torrens, and Gairdner. Another large salt lake of little depth, Lake Amadeus, lies a little W. of the center of Australia.

Climate.—The climate of Australia is generally hot and dry, but very healthy. In the tropical portions there are heavy rains, and in most of the coast districts there is a sufficiency of moisture, but in the interior the heat and drought are extreme. Considerable portions now devoted to pasturage are liable, at times, to suffer from drought.

Mineralogy.—Australia is a region containing a vast quantity of mineral wealth. Foremost come its rich and extensive deposits of gold. Australia also possesses silver, copper, tin, lead, zinc, antimony, mercury, plumbago, etc., in abundance, besides coal and iron. Various precious stones are found, as the garnet, ruby, topaz, sapphire, and even the diamond. Of building stone there are granite, limestone, marble, and sandstone.

Plant Life.—The Australian flora presents peculiarities which mark it off by itself in a very decided manner. Many of its most striking features have an unmistakable relation to the general dryness of the climate. The trees and bushes have, for the most part, a scanty foliage, presenting little surface for evaporation, or thick leathery leaves well fitted to retain moisture. The most widely spread types of Australian vegetation are the various kinds of gum tree (*eucalyptus*), the shea-oak (*casuarina*), the acacia or wattle, the grass tree (*xanthorrhœa*), many varieties of *proteaceæ*, and a great number of ferns and tree ferns. Individual specimens of the peppermint (*E. amygdalina*) have been found to measure from 480 to 500 feet in height. As timber trees the most valuable members of this genus are the *E. rostrata* (or red gum), *E. leucoxylon*, and *E. marginata*, the timber of which is hard, dense, and almost indestructible. A number of the gum trees have deciduous bark. The wattle or acacia includes about 300 species, some of them of considerable economic value, yielding good timber or bark for tanning. The most beautiful and most useful is that known as the golden wattle (*A. dealbata*), which in spring is adorned with rich masses of fragrant yellow blossoms. Palms—of which there are 24 species, all except the cocoa-palm peculiar to Australia—are confined to the N. and E. coasts. A plant which covers large areas in the arid regions is the spinifex or porcupine grass, a hard, coarse, and excessively spiny plant. Other large tracts are occupied by herbs or bushes of a more valuable kind, from their affording fodder. Foremost among those stands the salt-bush (*atriplex nummularia*, order *chenopodiaceæ*). Beautiful flowering plants are numerous. Australia also possesses great numbers of turf-forming grasses, such as the kangaroo grass (*anthistiria australis*), which survives even a tolerably protracted drought. The native fruit trees are few and unimportant, and the same may be said of the plants yielding roots used as food; but exotic fruits and vegetables may now be had in the different colonies in great abundance and of excellent quality. The vine, the olive, and mulberry thrive well, and quantities of wine are now produced. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugar-cane.

Animal Life.—The Australian fauna is almost unique in its character. Its great feature is the nearly total absence of all the forms of mammalia which abound in the rest of the world, their place being supplied by a great variety of marsupials —these animals being nowhere else found, except in the opossums of America. There are 110 kinds of marsupials (of which the kangaroo, wombat, bandicoot, and phalangers or opossums, are the

best known varieties), over 20 kinds of bats, a wild dog (the dingo), and a number of rats and mice. Two extraordinary animals, the platypus, or water mole of the colonist (*ornithorhynchus*), and the porcupine ant-eater (*echidna*) constitute the lowest order of mammals (*monotremata*), and are confined to Australia. Their young are produced from eggs. Australia now possesses a large stock of the domestic animals of England, which thrive there remarkably well. The breed of horses is excellent. Horned cattle and sheep are largely bred, the first attaining a great size, while the sheep improve in fleece and their flesh in flavor. There are upward of 650 different species of birds, the largest being the emu, or Australian ostrich, and a species of cassowary. Peculiar to the country are the black swan, the honey sucker, the lyre bird, the brush turkey, and other mound building birds, the bower birds, etc. The parrot tribe preponderate over most other groups of birds in the continent. There are many reptiles, the largest being the alligator, found in some of the northern rivers. There are upward of 60 different species of snakes, some of which are very venomous. Lizards, frogs, and insects are also numerous in various parts. The seas, rivers, and lagoons abound in fish of many varieties.

Peoples.—The natives belong to the Australian negro stock, and are sometimes considered the lowest as regards intelligence in the whole human family, though this is doubtful. They are believed to number between 75,000 and 100,000, exclusive of those in the unexplored parts. They are of a dark-brown or black color, with jet-black curly, but not woolly, hair, of medium size, but inferior muscular development. They have no fixed habitations; in the summer they live almost entirely in the open air, and in the more inclement weather they shelter themselves with bark erections of the rudest construction. They have no cultivation and no domestic animals. Their food consists of such animals as they can kill, and no kind of living creature seems to be rejected, snakes, lizards, frogs, and even insects being eaten, often half raw. They speak a number of different languages or dialects. They are occasionally employed by the settlers in light kinds of work and as horse-breakers. The weapons of all the tribes are generally similar, consisting of spears, shields, boomerangs, wooden axes, clubs, and stone hatchets. Of these the boomerang is the most singular, being an invention confined to the Australians.

Government.—In addition to the central federated government (see AUSTRALIAN COMMONWEALTH), each colony has a governor, administration, and a Legislature of its own. The governors are appointed by the King, and all acts passed by the Colonial Legislatures must receive the royal assent. Each Legislature consists of two houses, a Legislative Council and a Legislative Assembly, the lower house being elected. The legislative power of the Commonwealth is vested in a Federal Parliament which consists of the King, represented by the governor-general, a Senate, and a House of Representatives. The Senate consists of six senators for each of the original states, chosen for six years. The House of Representatives consists theoretically of twice as many members as there are senators. The House continues for three years from the date of its first meeting, unless sooner dissolved. Elections are on the basis of universal suffrage, male and female. The executive power is in the hands of a governor-general, who is assisted by an executive council. There is no established Church in any of the colonies. The denomination which numbers most adherents is the English or Anglican Church, next to which come the Roman Catholics, Presbyterians, and Methodists. Education is well provided for, instruction in the primary schools being, in some cases, free and compulsory, and the higher education being more and more attended to. There are flourishing universities in Melbourne, Sydney, and Adelaide.

Industries.—The chief agricultural product is wheat, of which there was a total acreage in 1918 of 9,774,658, with a production of 114,733,584 bushels. Other important crops are oats, barley, maize, hay, potatoes, sugar cane, and fruit. The total acreage of all crops in 1918 was 14,298,982, and the total value of production in that year was £57,967,307. The production of wool in 1917 and 1918 amounted to 573,864,083 pounds, valued at £37,062,000. The mineral production in 1918 was valued at £26,333,000, of which the gold produced amounted to £5,408,000, silver and lead £6,105,000, copper £4,465,000, tin £1,432,000 and coal £6,124,000.

There are about 16,000 manufacturing establishments employing about 330,000 hands. The value of the output in 1917 was £206,386,646.

The imports in 1918-1919 were valued at £93,485,050. The exports were valued at £106,805,895. The chief imports were textiles, metal manufactures, wearing apparel, drugs and chemicals, and paper. The chief exports were wool, wheat, flour, skins and hides. For more detailed information in relation to the

commerce of the various states, see the titles of these states.

History.—It is doubtful when Australia was first discovered by Europeans. Between 1531 and 1542 the Portuguese published the existence of a land which they called Great Java, and which corresponded to Australia, and probably the first discovery of the country was made by them early in the 16th century. The first authenticated discovery is said to have been made in 1601, by a Portuguese named Manoel Godinho de Eredia. In 1606, Torres, a Spaniard, passed through the strait that now bears his name, between New Guinea and Australia. Between this period and 1628, a large portion of the coast line of Australia had been surveyed by various Dutch navigators. In 1664 the continent was named New Holland by the Dutch Government. In 1688 Dampier coasted along part of Australia, and about 1700 explored a part of the W. and N. W. coasts. In 1770 Cook carefully surveyed the E. coast, named a number of localities, and took possession of the country for Great Britain. He was followed by Bligh in 1789, who carried on a series of observations on the N. E. coast, adding largely to the knowledge already obtained of this new world. Colonists had now arrived on the soil, and a penal settlement was formed (1788) at Port Jackson. In this way was laid the foundation of the future colony of New South Wales. The Moreton Bay district (Queensland) was settled in 1825; in 1835 the Port Philip district. In 1851 the latter district was erected into a separate colony under the name of Victoria. Previous to this time the colonies both of Western Australia and of South Australia had been founded —the former in 1829, the latter in 1836. The latest of the colonies is Queensland, which only took an independent existence in 1859. The discovery of gold in abundance took place in 1851, and caused an immense excitement and great influx of immigrants. The population was then only about 350,000, and was slowly increasing; but the discovery of the precious metal started the country on that career of prosperity which has since been almost uninterrupted. Convicts were long sent to Australia from the mother country, but transportation to New South Wales practically ceased in 1840, and the last convict vessel to West Australia arrived in 1868.

Australia in the World War. — The declaration of war on the part of England against Germany reached Australia by cable early in the day on Aug. 5, 1914.

Parliament was not in session, but the spirit of the people rose at once to the great occasion and the Prime Minister, Hughes, offered the government at home an immediate draft of 20,000 men. At the first call a much greater number responded and nation-wide training was begun. Before any troops were ready for embarkation the national spirit had stimulated the enrollment of a further contingent of 10,000 men. The first embarkation for Europe by way of Egypt and the Suez Canal the following end of November had already been preceded by naval operations against the enemy in southwestern waters.

With the co-operation of the New Zealand troops, the first contingent of which was formed about the same time as that of Australia, the German wireless chain in the Pacific had been destroyed and Germany deprived of all her holdings in that part of the world. In the latter part of August German Samoa was taken, and by the end of September New Pommern (New Britain). During the formation of the first contingent in Australia national patriotism rose to a fever pitch, a spirit which was afterward splendidly reflected in the performance of her sons in the trench and field. Much of their fighting was to be done in connection with the New Zealanders, the combined forces being known under the popular name of Anzacs, *i. e.*, Australia-New Zealand Army Corps. The nation stood behind its troops. From the day of the announcement of war contributions came pouring in. Several million dollars were at once donated, besides large contributions of horses and general supplies by rich Australians—of whom there is a large contingent. A most remarkable feature of the national situation was that the enthusiasm of the hour so carried away a large number of German residents in the country that they at once became naturalized and pledged their support to their adopted country. A change of ministry in the month following the outbreak of war did not in any way affect the general situation. The Laborites, who succeeded the Liberals, continued the forwarding of war preparations with equal enthusiasm, although the two parties continued to oppose one another in Parliament with unabated vigor.

Following the first contingent, more than 20,000 men which the nation sent to Europe in November (1914), a second expeditionary force of 25,000 was embarked a month later. Meantime a third force of 20,000 men had been called for, and was being rapidly recruited. A popular call for all able-bodied men to enlist for the firing-line and for all others to join rifle clubs was being responded to

enthusiastically. Public speakers were stirring up the people everywhere.

In the spring of 1915 the Australian troops first made themselves a name in the history of the war by taking part in the attempt to force the passage of the Dardanelles in the latter part of April. Landing on the Gallipoli Peninsula "they carried the fortified heights in the face of a raking Turkish fire, the positions won at that time being held throughout the campaign, which was characterized by consistent courage and resourcefulness."

This action received high praise from the British command. It was soon announced that Australia would be able to send 100,000 more men across seas. In less than a year up to July, 1915, the Commonwealth had furnished approximately 100,000 troops. Australia was also foremost from the first in Belgium relief, Melbourne, in April and May of 1915, contributing £80,000 as the proceeds of two entertainments, while Sydney and its province raised nearly £500,000.

It also came at once to the front in the furnishing of munitions to the general cause, being able to announce, as early as June following the outbreak of war, its readiness to begin to co-operate. Offers had indeed been made of ammunition for eighteen-pounders to Great Britain as early as the previous September. In February of the following year, 1916, the question of conscription became important. Premier William M. Hughes was appointed a member of the Canadian Privy Council and came to Canada and conducted a vigorous campaign in its favor as afterward in England. The Labor party in New South Wales, Queensland, and Victoria, however, was opposed, and after a sharp struggle the more radical elements failed and the measure was defeated by popular vote on Oct. 28. Australia had by this time 320,000 enlisted men in the ranks. Before the close of the war more than 362,000 volunteers had been sent to the firing-line. They entered the war on the British front in April, 1916, and soon acquired a name for a dauntless courage which inspired the older troops. In the battle of Messines Ridge following the defeat of the Germans at Ypres in June they took a prominent and notable part in the offensive of combined English, Irish, and New Zealand troops which "within a few minutes captured the entire first line positions on a ten-mile front." In the great battle of Arras, May, 1916, they distinguished themselves by capturing Bullecourt (May 13-17) after heavy fighting. They were also conspicuous in the Allied drives, notably, besides those mentioned, at Mouquet Farm and Pozières. In the advance of the Germans on the salient which threatened Amiens in the spring of 1918 the five Australian divisions played an important part. At two important points, Derlancourt and Morlancourt, before their line could be properly organized and before their guns had all arrived, they were persistently attacked by the Germans and yet always succeeded in driving them back with heavy loss. The Australian forces engaged in those important campaigns were old and well-tried troops who were of notable value all through the engagement which resulted in the repulse of the Germans.

In the first four years of the war Australia raised six war loans. From August, 1914, to June 30, 1918, her war expenditure amounted to 184,598,097 pounds sterling, of which £159,895,938 was from loans, and the balance revenue. The sum advanced by the Imperial Government amounted to £47,500,000.

In addition a Wheat Commission was organized under Premier Hughes with a regular service to England that contributed large supplies during the term of its operation. On the sea the Australians took a glorious part in the engagement off Dogger Bank—the principal naval event of the war—under Admiral Beatty Jan. 24, 1915, and later in the Battle of Jutland Bank. Out of a total population of six million people the Australia-New Zealand Army Corps, up to January, 1918, had contributed more than 448,000 men, of the very best material of which the Allied fighters were composed.

The conditions following the conclusion of peace in 1919-1920 were the same as prevailed in other countries of the world. There were labor troubles, and for a period in 1919 the industry of the country was practically tied up as a result of strikes. Alleged attempts of the Bolshevists to spread propaganda in 1919 resulted in serious disturbances. Australia was strongly represented at the peace negotiations in Paris, and the Commonwealth was given mandatory powers over island territories formerly the property of Germany. These include New Guinea (formerly German New Guinea), Bismarck Archipelago, and the Solomon Islands.

AUSTRALIAN ALPS, a range of mountains in the S. E. of Australia, formerly part of the Great Dividing Range, stretching from the neighborhood of Melbourne, about 37° 40′ S., 145° 30′ E., to the S. E. of New South Wales, about 35° S., 149° E., over a length of about 400 miles, with a width of about 100 to

150 miles. The highest peaks are in New South Wales, and the highest of all, according to Lendenfeld, is the peak called by him Mt. Townshend (7,353 feet), belonging to a group which he calls the Kosciusko group, the latter name having been previously applied to another peak (called Mueller's Peak by Lendenfeld), a few miles to the N. which was long believed to be the highest. The peaks next in height belong to the Bogong group in Victoria, and the W. of the Mitta Mitta, the highest of which is Mt. Bogong (6,508 feet). They do not reach the snow line, though snow lies in the higher valleys all the summer. Volcanic rocks cover the tableland to the S. of Mt. Bogong.

AUSTRALIAN COMMONWEALTH, a political union of all the Australian colonies, the agitation for which began in 1852. The first convention for this purpose was held at Hobart in January, 1886. The colonies represented were Victoria, Queensland, Tasmania, Western Australia, and Fiji. This effort was abortive, but another conference took place in 1891, at Sydney, N. S. W., which was attended by delegates from each of the colonies. A plan of Federal government was proposed, which resembled in many of its features that of the United States. A draft bill to constitute the Commonwealth of Australia was adopted by the convention, and it was agreed to submit it to the approval of the individual Legislatures of the several colonies. This bill met with success in the lower branch of but one colonial Legislature—that of Victoria. In January, 1895, there was a conference of premiers of five colonies at Hobart, and the Legislative Assembly of New South Wales passed a Federal enabling act in November of that year. The first practical step was taken in 1898. A convention of representatives of New South Wales, Victoria, Tasmania, South Australia, and Western Australia succeeded in drafting a constitution, which was submitted to the popular vote of each of those colonies in June. By the terms of the plebiscite, an affirmative vote of substantially one-third of the electors of New South Wales, and of one-fifth of the electors of each of the other colonies, was required to adopt this constitution. The returns of the election in June were fatal to the scheme.

On Feb. 2, 1899, a unanimous agreement was reached by the colonial premiers in conference at Melbourne, regarding the unsettled questions referred to them by the colonial Legislatures, thus insuring the success of the federation project.

The new Commonwealth came into existence on Jan. 1, 1901, and the Earl of Hopetoun was appointed first Governor-General. Melbourne was designated as the temporary capital until a site for a Federal district could be selected. Measures passed for restricting immigration greatly retarded the growth of the Commonwealth. A protective tariff bill was passed in 1902. A notable feature of the political development of the first years of the twentieth century was the growth of the Labor party, which stood practically for a modified socialism and especially for the principle of the so-called "White Australia." The Commonwealth has grown steadily and its loyalty to the Empire has remained undiminished. Conclusive proof of this was given by the prompt and unsolicited entry of Australia in the war. See AUSTRALIA, section AUSTRALIA IN THE WORLD WAR.

AUSTRASIA (the East Kingdom), the name given, under the Merovingians, to the eastern possessions of the Franks, embracing Lorraine, Belgium, and the right bank of the Rhine.

AUSTRIA, REPUBLIC OF, the territory which formed the nucleus of the former Austro-Hungarian empire, and known as the Archduchy of Austria, occupying both sides of the valley of the Danube, between the Salzach and Inn on the W., which form the boundary with Bavaria to the S. of the Danube, and the March and Leitha on the E., which form together the greater part of the boundary with Hungary; divided into the crownlands of Upper and Lower Austria, the boundary between which, S. of the Danube, is partly formed by the lower Enns; chief towns, Vienna in Lower, Linz, in Upper, Austria. The surface for the most part is mountainous or hilly, but sinking down to plains on both sides of the Danube in the E., the Marchfeld on the N. of that river, between Vienna and the March, being remarkably level.

The only special agricultural product that need be mentioned is wine, some choice kinds being produced on the sunny slopes of the Wienerwald. The most important mineral product is the salt of the Salzkammergut, the center of which is Ischl. As regards other minerals, the chief mining districts are Wels in Upper, St. Pölten in Lower, Austria, and the principal products, lignite in Upper, and coal, iron ore, lignite, and graphite in Lower, Austria. The principal manufacturing centers in Lower Austria prior to the war were Vienna (miscellaneous), Wiener-Neustadt (cottons, etc.), and, in the W., Waidhofen (iron); in Upper Austria, Steyr (iron), and Linz (wool-



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ens, etc.). Originally a margravate, Austria was erected into a duchy in 1156, and the title of archduke (borne solely by members of the Hapsburg family) was first formally conferred by imperial letters patent in 1453, though it had previously been assumed by some of the Dukes of Austria. See also AUSTRIA-HUNGARY.

AUSTRIA-HUNGARY, a former empire of Europe, composed of a Cisleithan portion officially known as Austria, and a Transleithan portion known as Hungary, each having its own constitution, a limited monarchy and each formerly possessing a separate Parliament, but uniting under a common sovereign in the establishment of a common army, navy, financial, diplomatic, postal, and telegraphic services.

Supreme Legislature.—Legislation in regard to common affairs was accomplished by a supreme body known as the Delegations. Of these there were two, each composed of 60 members, representing the legislative bodies of Austria and Hungary, the upper houses returning 20 and the lower houses 40 delegates. The members of the Delegations were appointed for one year, summoned annually by the Emperor, alternately at Vienna and at Budapest. Subject to the Delegations were the four executive departments for Common Affairs, Foreign Affairs, War, and Finance. The agreement between the two countries, termed the Ausgleich, embraced the regulation of their fiscal and commercial affairs, of the quota paid by them to the common expenses of the empire, and the privileges of the Austro-Hungarian Bank.

Empire of Austria.—Austria (capital Vienna) had an area of 115,903 square miles; pop. before the World War 28,571,934; was governed by an Emperor and by the Reichsrath, or Council of the Empire, consisting of an Upper House (Herrenhaus), and a Lower House (Abgeordnetenhaus). The Reichsrath had its own ministers and government, and exercised full parliamentary functions on all matters within its competence—from which, however, foreign affairs and war were excluded. The Upper House was composed of the princes of the imperial family who were of age, hereditary nobles, of archbishops and bishops, and of life members nominated by the Emperor for distinguished services in science or art, or to the Church or State. The Lower House contained about 350 members, who were the popular representatives of the 16 provinces which comprised the empire. They were elected for six years by four groups: the large landed proprietors; the chambers of commerce; the inhabitants of towns, who paid 50 florins in direct taxation, or who had a vote for the Provincial Diet; and the inhabitants of country districts similarly qualified. In these four groups there were comprised about 2,000,000 voters. Purely provincial matters were administered by 16 Provincial Diets, while local matters were dealt with by communal councils.

Religion and Education.—The chief religious bodies in Austria, where religious liberty is the ruling principle, are Roman Catholics, Old Catholics, Lutheran and Reformed Evangelicals, Armenians and Jews. In Hungary much the same divisions exist. See HUNGARY, JUGOSLAVIA, CZECHO-SLOVAKIA, BOHEMIA, BOSNIA, WORLD WAR, etc.

At the close of the Balkan wars, in 1913, Serbia was left in a far stronger condition than she had ever been in before. She had demonstrated her martial valor and had, in consequence, received large accessions of territory. Her growth was extremely displeasing to Austria, which did not relish the idea of having so strong a neighbor, capable perhaps of barring her way across the Balkans to Saloniki. Before and during the war, she had attempted to thwart Serbia's legitimate national aspirations, and after the conflict had ended in Serbia's favor, she had done all she could through diplomacy to rob her of the fruits of victory. Later she had tried to make a secret arrangement with Italy to attack Serbia on the ground that her Adriatic interests were threatened by the latter, but Italy had rejected the overture.

Austria's seizure a few years previously of Bosnia and Herzegovina was another source of the friction between the two nations. The two provinces were largely Serbian in population and almost wholly so in sympathy. Their national aspirations sought to assert themselves against the alien domination of Austria, and the repressive measures adopted by the latter fostered plots and conspiracies. Austria, in casting about for a pretext for aggression against Serbia, accused the latter of fostering this spirit of revolt, secretly if not openly. This Serbia denied. The bad blood between the two nations was patent to the world, and it was assumed that it was only a matter of time before some act would be seized upon as a pretext for open hostilities.

The occasion was furnished on June 28, 1914, when the Austrian Archduke Franz Ferdinand, heir to the Austrian throne, was assassinated, together with

his wife, by a student named Prinzip, at Serajevo, Bosnia, while he was making a tour of the province. The assassin was at once apprehended and held for trial. The tragedy created a very bitter feeling in Austria, which claimed that the plot had been hatched in Belgrade, with the connivance of Serbian officials. Serbia denied this, but promised a rigorous inquiry into the matter.

A plausible pretext for war had now been found, and Austria set to work at once to make it unavoidable. On July 23, 1914, the Austrian Minister at Belgrade presented to the Serbian Government a note from Austria so offensively couched that it startled the world. Compliance with its terms would have made Serbia simply the vassal of Austria. It was practically an ultimatum and demanded an answer in two days. At the end of that time, Serbia replied in a note of studied moderation, accepting all the terms but two. These would have practically stripped her of sovereignty. Even these two Serbia offered to submit to arbitration.

The diplomatic exchanges between the nations that accompanied and followed the Austrian note and the Serbian reply are fully treated elsewhere. (See WORLD WAR.) Austria could not be dissuaded from her predetermined course and on July 28, 1914, declared war on Serbia.

Military operations began at once and Belgrade was bombarded, while an invasion was attempted of Serbia over the Bosnian border. This was checked almost at its inception, but by the end of October an invasion in force was made with 300,000 men. The Serbians, outnumbered, fell back to the hills, where battle was joined Dec. 6 and resulted in a crushing Austrian defeat. The invaders fled in utter rout, and by Dec. 15 the Austrians had been driven across the border and Belgrade had been regained.

Against the Russians the Austrians were equally unsuccessful. On Sept. 1, the Russians began the great battle which resulted in a victory for them, and the capture of the city of Lemberg, capital of Galicia, with a vast number of prisoners and material of war. The Austrians were compelled to seek refuge in the great fortress of Przemysl, which was later invested by the Russians, who compelled its capitulation March 22, 1915, involving the surrender of 130,000 men and 4,000 officers.

Seventy thousand more were captured by the Russians in a tremendous attack upon the Carpathian passes in April, and there was every prospect that they would be able to force the passes and pour into Hungary. But at this juncture the tide of battle turned. The Russian Government had failed to keep the army of Grand Duke Nicholas supplied with arms and ammunition, and they were powerless to check the drive directed against them on May 2 by German forces, who in a few weeks had driven them out of the Carpathians and far into Volhynia. This drive, however, which eventually won Warsaw, Ivangorod, Brest-Litovsk, Kovel, Grodno, and Vilna, was purely a German one in its inception and execution, although Austrian forces co-operated under German officers. The operations persisted through the summer and early fall, but by Oct. 1 the German advance had been completely halted.

The campaign of early 1916 was marked by the defeat of Serbia and the taking possession of that gallant little country by the Austrians and Germans, after the Serbians, overwhelmed by numbers, had made a most desperate resistance. Montenegro also was conquered, its principal stronghold, Mt. Lovcen, falling into Austrian hands on Jan. 11.

In the meantime, Italy had entered the war, and had gained some initial advantages on the Carso Plateau. The Austrians concentrated heavy forces on that front, and on May 14 defeated the Italian General Cadorna on a line extending from Val Giudicaria to the sea. The strategic plan of the Austrians was to capture the Italian forces on the Isonzo, with the hope of forcing Italy out of the war and permitting the Austrians to attack France on the Franco-Italian frontier. The plan, however, failed, although Austria made decided gains in the Tyrol and the Trentino. By June 25 the Italian army was strong enough to take the initiative, and regained considerable of their lost ground. A still more formidable offensive was launched by them on Aug. 6 with Gorizia as the objective. The city was captured on the 9th. By Aug. 17 the Italians had taken many guns and 15,000 prisoners.

During this period, a remarkable Russian offensive had been in full swing on Austria's eastern front. The supreme command of the Russian armies had been assumed nominally by the Czar, although General Alexieff, assisted by Ivanoff and Brusiloff, was really at the head of operations. The successes attained were among the most remarkable of the war, both in the territory gained and the number of prisoners taken. Lutsk was captured June 6, and Dubno on the 8th. On June 17, the Russians captured the important city of Czernowitz, and by the

23d had overrun the whole of Bukowina. Kolomea was taken June 29. On July 8 the Russians captured Delatyn, and cut the railroad that ran through one of the passes of the Carpathians. During these operations, thousands and tens of thousands of prisoners were being taken every day, and by the time the campaign came to an end, about the first of September, the Russians had occupied 7,000 square miles of territory and taken 400,000 prisoners. A most damaging blow had been dealt to the Austrian morale, which was not made up by the conquest of Rumania, which was carried through by Germans, Bulgarians, and Turks with but little Austrian assistance.

In February of 1917, the Austrians attacked the Italians in the vicinity of Gorizia and on the Carso Plateau, in an endeavor to regain the initiative. But the effort came to nothing and the opposing armies remained quiescent until the middle of May, when the Italians started a terrific offensive, that was maintained continuously for eighteen days. The operations were carried on at a point on the Isonzo between Tolmino and Gorizia, and Vodice Ridge and Mt. Cucco were speedily captured, with other important strategic points. The arrival of heavy reinforcements held the drive in check for a while, but it was resumed on Aug. 19. A marked success was gained in the capture of Monte Santo and more than forty villages, while the Austrian lines were penetrated to a depth of 7 miles on an 11-mile front.

On the eastern front, another offensive was launched by the Russians on July 1, 1917, with Lemberg as an objective. The Russians reached points within 40 miles of that city, and then were stopped. The Russian army was by this time honeycombed with mutiny and a prey to Bolshevist influences. By July 21 it was in full retreat, whole regiments and brigades throwing away their arms and refusing to fight. The collapse of Russia had begun, and the pursuit of the retreating troops by the Austrians and Germans was unhindered by any serious resistance. Stanislau, Tarnopol, and Czernowitz were recaptured in quick succession, as the Russians fled toward their own frontiers. There was no longer aggressive action to be feared from that quarter, and Austria was free to throw the bulk of her forces against the Italian front.

That concentration, with the assistance of the Germans, was instrumental in gaining a momentous victory over the Italians. But the greatest contributing element to this victory was the skillful use of subtle propaganda among a certain corps of the army that had weakened its morale. On Oct. 24, a terrific attack was begun by the combined German and Austrian armies, headed by picked divisions of German shock troops. The violence of the onset broke the Italian lines, and what was almost a panic followed. The offensive carried everything before it. In a week the Teutons had captured 23,000 guns and 250,000 men. The first stand of the Italians was at the Tagliamento, where they endeavored to hold back the invaders, but were forced three days later to continue their retreat to Livenza. Their resistance was stiffening, however, and when they reached the Piave they were at last able to halt their pursuers. The Austro-Germans, however, still achieved further important strategical successes in the mountain region, and pushed their lines forward until they were within 8 miles of the Venetian plain. Here, however, they were compelled to pause. Another attempt to overwhelm the Italians, before snow should come to their aid in blocking the mountain passes, was made on Dec. 3, and resulted in six days of severe fighting, in which the invaders made some real but not vital gains. The offensive then came practically to a halt. Venice had not been captured, but important positions had been gained that seemed to promise easy access to the Venetian plain as soon as the coming of spring should permit the resumption of operations on a vast scale.

The danger was perceived and to some extent rectified by the Allies during the winter. Veteran forces of British and French troops had been hurried to the relief of the Italians, not only to reinforce their numbers, but to strengthen their morale, which had been shaken by the disaster they had suffered. While the latter were reorganizing and rehabilitating their forces, the French and British, under the direction of General Fayolle and General Plumer respectively, carried out brilliant local actions in the mountains and on the Piave that greatly improved the Allied positions. Vigorous attacks in late December and January wiped out Austrian salients on Monte Tomba and on the Piave, and closed the gates through which the next Austro-German movement was expected.

Conditions in the polyglot Empire of the Hapsburgs were very bad in the spring of 1918. The food situation especially was menacing, and repeated cuts were made in the already meager rations doled out to the people. The promised supply of cereals from the Ukraine did not materialize, except to a very limited degree. Political conditions were cha-

otic, owing to the inability of the Government to satisfy the claims of the various racial elements that made up the Empire. There was a vast war weariness, and all that the majority of the population sorely wanted was peace and bread.

Peace was sought by Count Czernin in a conciliatory and moderate speech that he delivered to the Vienna City Council, which was in effect a reply to an address of President Wilson on war aims. He defended the treaty of Brest-Litovsk, which had been scathingly denounced by the American President, and declared himself to be in agreement with many of the latter's principles. A maladroit reference to peace discussions, which, he said, had occurred between France and Austria, on the initiative of the French Premier, Clemenceau, gave rise to one of the most sensational diplomatic incidents of the war. The charge was hotly denied by Clemenceau, who declared that the first step had been taken by Austria, and who, in the discussion that arose, produced a letter written by Emperor Charles himself to a relative by marriage, Prince Sixtus of Bourbon, in which he referred to "France's just claim regarding Alsace-Lorraine." The publication of the letter produced great tension between Berlin and Vienna and Charles was forced to make humiliating explanations before the breach between the governments was closed.

Matters were made still worse by a great military disaster on the Italian front. The German drive in Picardy had been halted, and the dimmed prestige and morale of the Central Powers required a victory in other fields. The Austrian commanders were so confident that this would be achieved, that they had medals struck in advance, commemorating their imagined triumphal entry into Venice. They had an army of over 1,000,000 men, and they fully expected to repeat the victory of Caporetto over the supposedly disheartened Italian army. On June 15, they made an attack on a front of 97 miles, reaching from the Asiago Plateau to the sea. Their superiority in numbers gained them some initial advantages, and by the 18th they had extended their line over the Montello Plateau to Casa Serena. On the 19th, however, the Italians assumed the initiative, and before long they were driving the invaders back in headlong retreat that soon became a rout. The elements were against the Austrians also, as heavy tempests had swelled the Piave at their back, and swept away the bridges over which they sought to make their escape. The carnage was ghastly. Men were drowned by thousands, while a storm of shot and shell harried the fugitives. The Austrian losses in killed, wounded and prisoners exceeded 100,000, and enormous quantities of guns, ammunition, and supplies were left in the hands of the victors. The battle practically closed the campaign for that spring and summer. It was the most terrible disaster that had befallen the Austrian arms up to that time in the war.

For the rest of the summer and early fall the opposing armies faced each other, recuperating from their efforts and reorganizing their forces for the last decisive battle. In the interim, Austria, dismayed by her own situation, and the repeated defeats being inflicted upon the Germans, who were being steadily driven back in France and Belgium, was making frantic efforts to secure peace terms before she was utterly overcome in the field. The story of her "peace offensive" has been fully described in another part of this work.

Her efforts, however, were fruitless, and the issue had to be decided by the arbitrament of arms. On Oct. 24, the Italians attacked in the Piave and Monte Grappa regions. For scarcely 24 hours, the Austrians resisted, and then their lines gave way everywhere. Soon all pretense of fighting vanished, and the retreat became a debacle. Whole regiments and brigades were captured. By Nov. 3 the Italians had captured 5,000 guns and over 300,000 prisoners in one of the most overwhelming victories of modern times. On that date the Austrian commander applied for an armistice, which was granted, the terms going into effect on the following day. On Nov. 11, Emperor Charles, following the example of the Kaiser, abdicated and removed to the castle of Eckhartsau, from which he afterward went into exile in Switzerland.

Disintegration set in immediately. The Empire fell apart like a house of cards. There had never been a real bond of national feeling to hold together the conglomerate races that composed it. On Nov. 15 the Republic of Czecho-Slovakia was established, with Prague as its capital. It embraced the former Austrian crownlands of Bohemia, Silesia, and Moravia, together with part of Hungary The area was four times that of Belgium. Its economic resources were great, as before the war it had furnished 60 per cent. of Austrian iron and 83 per cent. of the coal of the Empire. Thomas G. Masaryk was chosen as its first President, Nov. 19, and a loan of $7,000,000 was negotiated with the United States.

Jugoslavia also sprang into existence at the dissolution of the parent state. It was a confederation of Bosnia, Herzegovina, Croatia, Slovenia, and Dalmatia of the former Austrian territory with Montenegro and Serbia, the latter to be the leading member. On Dec. 1 the office of ruler was offered to Prince Alexander of Serbia and accepted by him. The new government was recognized by the United States Feb. 7, 1919.

Hungary also broke its partnership with Austria, and the Hungarian People's Republic was proclaimed Nov. 16, 1918, with Karolyi as Provisional President. The Cabinet that was formed, however, proved unable to cope with the terrible conditions that were the aftermath of the war and resigned in January, Karolyi himself soon afterward following its example. The Communist elements gained control, and a reign of terror was inaugurated under the Bela Kun régime. See HUNGARY.

Little else than Vienna was left to Austria proper after it had thus been stripped of its richest provinces. On Nov. 13, two days after the Emperor's abdication, the National Assembly demanded the creation of a republic that should bear the name of German Austria, and arrangements were made for the election of a National Constituent Assembly on the basis of universal suffrage. That election took place on Feb. 16, 1919, and the new body proceeded to frame a constitution. A desire prevailed to unite with Germany, but this was later forbidden by the Peace Conference.

The framing of the peace treaty with Germany took so much time that it was June 2, 1919, before the Austrian terms were handed to the Austrian delegates at St. Germain-en-Laye, a suburb of Paris. The treaty followed closely the lines of the German treaty. Austria was compelled to recognize the new states of Czecho-Slovakia, Jugoslavia, and Hungary, and to cede large portions of her remaining territory to Italy and Poland. Of her former population of about 50,000,000, she lost 43,000,000, and her former area of 240,000 square miles was reduced proportionately. She renounced her extra-European rights, accepted the League of Nations covenant and agreed to demobilize her aerial forces. Other economic and political concessions were demanded by the Treaty, which bore heavily on the vanquished state. As in the case of Germany, the Austrians protested vigorously against what they called the harshness of the Allied terms, but after several months of correspondence and counter-proposals the treaty was signed Sept. 10, 1919. An additional proviso made by the Allies was that the new state must abandon the title of "German Austria" and adopt that of "The Republic of Austria."

The economic condition of Austria after the war was worse than that of any other of the vanquished Powers. During the winter of 1919-1920, the inhabitants of Vienna were on the actual brink of starvation. Help was afforded by the nations of Europe and especially by the United States, and the people were tided through until the harvests of 1920 helped to bring about a restoration to more normal conditions. See RELIEF, WAR.

AUTHORS, BRITISH SOCIETY OF, an association of authors formed in London in 1883, for social and business purposes; has a governing committee of 30 members; maintains an attractive club-room and publishes a periodical called "The Author."

AUTHORS' CLUB, an American organization founded in New York City in 1882, and incorporated in 1887. It is governed by an executive committee without a president. Any person who is the author of a published book proper to literature, or of creditable literary work equivalent to such a book, is eligible to membership.

AUTHORS' LEAGUE OF AMERICA, an organization of authors formed to protect their interests and those of others engaged in the production of books and works of art, especially with reference to copyright. The league gives business advice to its members and provides confidential information in regard to publishers, managers, and others engaged in the sale of copyright material. Allied to the League is the Authors' League Fund, which has the object of furnishing assistance to authors and others in temporary financial difficulties. The league holds annual meetings at which questions affecting writers and publishers are discussed.

AUTOCHTHONES (â-tok'thō-nēz), the Greek name for the original inhabitants of a country, not settlers, considered as having sprung from the soil itself. The Athenians were fond of being so called; the ancients counted among autochthonous races also the Arcadians, Latins, Gauls, and Scythians. The Latin equivalent term was aborigines.

AUTOCRACY, a word signifying that form of government in which the sovereign unites in himself the legislative and the executive powers of the State, and thus rules uncontrolled. Such a sover-

eign is, therefore, called an autocrat. Nearly all Eastern governments are of this form. Among European rulers, the Emperor of Russia alone bore the title of Autocrat, the name indicating his freedom from constitutional restraint of every kind. In point of fact, the peculiar feature of an autocracy is the absence of regular and constitutional limits; it is a strong form of personal rule.

AUTO DA FÉ (â'tō dä fā), or **AUTO DE FÉ** ["Act of Faith," from Latin *actus*, act, and *fides*, faith], was, in certain Catholic countries, a solemn day formerly held apart by the Inquisition for the punishment of heretics, and the absolution of accused persons found innocent. Thousands of persons perished in this manner in Spain, Portugal, and their colonies. It was instituted in Spain in 1556, and the first instance occurred in 1560, at Valladolid.

AUTOGRAVURE, a process of photo-engraving, patented by J. R. Sawyer, of London, in 1884. If an ordinary autotype carbon print be placed on silvered copper instead of on paper, the slight relief which the picture possesses is enough to admit of an electrotype being taken from it. The raised parts of the print become the depressed parts in the electrotype. The latter can, therefore, be used for taking impressions from in the same way as an engraved copper-plate.

AUTOLYCUS (aw-tol'ē-kus), a son of Mercury, by Chione, a daughter of Dædalion, and one of the Argonauts. His exploits as a thief have been greatly celebrated.

AUTOMATIC GUN. See MACHINE GUN.

AUTOMATIC PISTOL, an arm adopted by the German Government for use in the army. It is charged with 10 cartridges at a time, may be reloaded with great speed, and is said to possess many advantages over the revolver. The charging is done automatically. The magazine is in the center of the weapon. A feature of the new weapon is a combination, which enables the pistol to be transformed, instantly, into a musket. This is done by using the case as a butt. The bullet of hardened lead weighs five and a half grams. The caliber is 7.03 mm. The initial velocity of the projectile is 425 meters. The sight is graduated to 500 meters, and the extreme range is about 1,000 meters.

AUTOMATISM, a word derived from two Greek words signifying self-movement, and usually applied to machinery constructed to represent human or animal actions; automatic, used of an apparatus, implies that it does its work with little or no guidance or interference from man, as in a telegraphic automatic transmitter. The construction of automata has occupied the attention of mankind from very early ages. Archytas of Tarentum is reported, as long ago as 400 B. C., to have made a pigeon that could fly.

AUTOMOBILES. See MOTOR VEHICLE.

AUTONOMY, the arrangement by which the citizens of a state manage their own legislation and government; and this evidently may, with certain restrictions, be the case also within limited bodies of the same people, such as parishes, corporations, religious sects. These districts or communities may be autonomous, if not absolutely, yet within certain defined limits. They may be said to enjoy a partial, limited, or local autonomy. Autonomy is often used to designate the characteristic of the political condition of ancient Greece, where every city or town community claimed the right of independent sovereign action. Recently the word is more specifically used of territories or provinces, which, while subject in some matter to a higher sovereignty, are autonomous in other respects. The self-government enjoyed by the British colonies may be described as a modified form of autonomy.

AUTOPLASTY, a mode of surgical treatment which consists in replacing a diseased part by means of healthy tissue from another part of the same body. The most familiar instance is the rhinoplastic or taliacotian operation, for supplying a new nose from the skin of the forehead. It is more popularly known as skin-grafting.

AUTOPSY, eye-witnessing, a direct observation; generally applied to a *post mortem* examination, or the dissection of a dead body.

AUTOTYPE, a method of phototyping. Tissue, being prepared with a liquid composed of gelatine, sugar, and bichromate of potash, is then used for taking a collodion negative in the ordinary way. It is next applied under water with the face down to a plate of glass, metal, or other paper, coated with gelatine and chrome alum. Means are then taken to remove the parts not hardened by light, and, finally, by another elaborate process, the plate is made ready for the printing-press.

AUTUMN, the season of the year which follows summer and precedes winter. Astronomically, it is considered to

extend from the autumnal equinox, Sept. 23, in which the sun enters Libra, to the winter solstice, Dec. 22, in which he enters Capricorn. Popularly, it is believed to embrace the months of September, October, and November.

AUTUN (ō-tun'), a city of France, in the department of Saône-et-Loire, on the Arroux, 43 miles S. W. of Dijon, on the railroad to Nevers. It is picturesquely situated. The Church of St. Martin, built by Queen Brunehaut, and containing her tomb, furnishes a variety of architectural styles. Autun is one of the most ancient French cities, and was made a Roman colony by Augustus, from whom it derived its old name of Augustodunum. It still presents many fine Roman remains. Talleyrand was Bishop of Autun at the commencement of the French Revolution; another bishop was Abbé Roquette, whom Molière immortalized. Pop. about 16,000.

AUVERGNE (ō-vārn), a former province of central France, now merged into the departments of Cantal and Puy-de-Dôme, and an *arrondissement* of Haute-Loire. The Auvergne Mountains, separating the basins of the Allier, Cher, and Creuse from those of the Lot and Dordogne, contain the highest points of central France: Mt. Dore, 6,188 feet; Cantal, 6,093 feet; and Puy-de-Dôme, 4,806 feet.

AUVERGNE, COUNTS AND DAUPHINS OF, a title which was, about the middle of the 8th century, conferred on Blandin, who served the Duke Waifre in his opposition to Pepin le Bref, founder of the Carlovingian dynasty. The name figures through a great part of early French history.

AUXERRE (ōz-ār'), the chief town of the French department of Yonne, on the Yonne river, 109 miles S. E. of Paris, in a rich district abounding in vineyards. It presents an imposing aspect from a distance, the most prominent feature being the noble Gothic cathedral, which dates from 1215. Auxerre was a flourishing town before the Roman invasion of Gaul. It was destroyed by the Huns in 451, and in 486 was wrested by Clovis from the Romans. The county of Auxerrois came finally in 1477 to the kingdom of France. The principal manufactures are wine (a light Burgundy), candies, chemicals and hosiery. Pop. about 25,000.

AVA, ARVA, YAVA, or KAVA (*piper methysticum*), a plant of the natural order *piperaceæ*, possessing narcotic properties. Until recently, it was ranked in the genus *piper* (pepper). It is a shrubby plant, with heart-shaped acuminate leaves, and very short, solitary, axillary spikes of flowers. It is a native of many of the South Sea islands, where the inhabitants intoxicate themselves with a fermented liquor prepared from the upper portion of the root and the base of the stem. The narcotic property is ascribed to an acrid resin *kawine*, which is present in the root. The intoxication is not like that produced by ardent spirits, but rather a stupefaction like that caused by opium. The habitual use of ava causes a whitish scurf on the skin, which, among the heathen Tahitians, was reckoned a badge of nobility, the common people not having the means of indulgence requisite to produce it. Ava is, like cocaine, a local anæsthetic.

AVALANCHES, masses of snow or ice that slide or roll down the declivities of high mountains, and often occasion great devastation. They have various names, according to their nature. Drift or powder avalanches consist of snow, which, loose and dry from strong frost, once set in motion by the wind, accumulates in its descent, and comes suddenly into the valley in an overwhelming dust-cloud. Avalanches of this kind occur chiefly in winter, and are dangerous on account of their suddenness, suffocating men and animals, and overturning houses by the compression of the air which they cause. Another kind of avalanche resembles a landslip. When the snow begins to melt in spring, the soil beneath becomes loose and slippery; and the snow slides down the declivity by its own weight, carrying with it soil, trees, and rocks. Ice avalanches are those that are seen and heard in summer thundering down the steeps—*e. g.*, of the Jungfrau. They consist of masses of ice that detach themselves from the glaciers in the upper regions. They are most common in July, August and September. Nine great Alpine avalanches, which cost 447 lives, are on record between 1518 and 1879, the most destructive being one of 1827, which swept away half the village of Biel, in the upper Valais, with 88 inhabitants.

AVALON, a peninsula forming the E. part of Newfoundland, in which St. John's, the capital, is situated.

AVALON, a borough of Pennsylvania in Allegheny co., about 6 miles W. of Pittsburgh. It is on the Ohio river, and the Pittsburgh, Fort Wayne and Chicago railroad. It is a suburb of Pittsburgh and is entirely residential. Pop. (1910) 4,317; (1920) 5,277.

AVANTURINE, or **AVENTURINE**, a variety of quartz containing glittering spangles of mica through it; also a sort of artificial gem of similar appearance.

AVARS, a people, probably of Turanian origin, who at an early period may have migrated from the region E. of the Tobol in Siberia to that about the Don, the Caspian Sea, and the Volga. A part advanced to the Danube in 555 A. D., and settled in Dacia. They served in Justinian's army, aided the Lombards in destroying the kingdom of the Gepidæ, and in the 6th century conquered under their khan, Bajan, the region of Pannonia. They then won Dalmatia, pressed into Thuringia and Italy against the Franks and Lombards, and subdued the Slavs dwelling on the Danube, as well as the Bulgarians on the Black Sea. But they were intimately limited to Pannonia, where they were overcome by Charlemagne, and nearly extirpated by the Slavs of Moravia. After 827 they disappear from history. Traces of their fortified settlements are found, and known as Avarian rings.

AVATAR, more properly AVATARA, in Hindu mythology, an incarnation of the Deity. Of the innumerable avatars the chief are the 10 incarnations of Vishnu, who appeared successively as a fish, a tortoise, a boar.

AVATCHA, a volcano and bay in Kamtchatka. The volcano, which is 9,000 feet high, was last active in 1855. The town of Petropavlovsk lies in the bay.

AVEBURY, a village of England, in Wiltshire, occupying the site of a so-called Druidical temple, which originally consisted of a large outer circle of 100 stones, from 15 to 17 feet in height, and about 40 feet in circumference, surrounded by a broad ditch and lofty rampart, and inclosing two smaller circles. Few traces now remain of the structure. On the neighboring grounds are numerous barrows or tumuli, one of which, called Silbury Hill, rises to the height of 130 feet, with a circumference of 2,027 feet at the base, covering an area of more than five acres.

AVELLANEDA Y ARTEAGA, GERTRUDIS GOMEZ DE, a distinguished Spanish poet, dramatist and novelist, born in Puerto Principe, Cuba, March 23, 1814; under the pseudonym PEREGRINA contributed to Andalusian journals many "Lyric Poems" (1851-1854), and afterward wrote a series of spirited novels: "Two Women," "The Baroness de Joux," and others. She gained still higher distinction with the tragedies "Alfonso Munio," the hero of which was her own ancestor, and "The Prince of Viana." Her latest compositions include the Biblical dramas "Saul" and "Balthasar." In the later years of her life she composed 16 plays which still have a place on the Spanish stage. She died in Madrid, Feb. 2, 1873.

AVE MARIA ("Hail, Mary"), the first two words of the angel Gabriel's salutation (Luke i: 28), and the beginning of the very common Latin prayer to the Virgin in the Roman Catholic Church. Its lay use was sanctioned at the end of the 12th century, and a papal edict of 1326 ordains the repetition of the prayer thrice each morning, noon, and evening, the hour being indicated by sound of bells called the Ave Maria or Angelus Domini. The prayers are counted upon the small beads of the rosary, as the pater nosters are upon the large ones.

AVENA, a genus of plants belonging to the order *graminaceæ*, or grasses. The *A. fatua*, or wild; the *A. strigosa*, or bristle pointed; the *A. pratenis*, or narrowed-leaved perennial; the *A. planiculmus*, or flat-stemmed; the *A. pubescens*, or downy; and the *A. flavescens*, or yellow oat, are species included in this genus. The first of this species is akin to the *A. sativa*, or cultivated oat. It is a cereal suitable for cold climates, not reaching proper maturity in the south. It attains perfection in Scotland, and is largely grown there. *A. nuda* is the naked or hill oat, or peel corn, formerly cultivated and used extensively by the poorer classes in the N. of England, Wales and Scotland.

AVERELL, WILLIAM WOODS, an American military officer, born in Cameron, N. Y., Nov. 5, 1832; was graduated at the United States Military Academy in 1855; served on the frontier and in several Indian campaigns till the beginning of the Civil War, when he was appointed Colonel of the 3d Pennsylvania Cavalry, and assigned to the command of the cavalry defenses of Washington. During the war he distinguished himself as a cavalry rider and commander, and at its close was brevetted Major-General of volunteers. He resigned from the regular army while holding the rank of captain, in 1865. He was United States Consul-General at Montreal in 1866-1869. He died at Bath, N. Y., Feb. 3, 1900.

AVERNUS, or **AVERNO**, a lake in the neighborhood of Naples, about 2½ miles N. W. of Puzzuoli, and near the coast of Baiæ, the waters of which were so unwholesome and putrid that no birds ever visited its banks. The ancients made it

the entrance of hell, by which Ulysses and Æneas descended into the lower regions. In the time of Vergil, a communication between it and the neighboring Lucrine Lake was made by Agrippa; but in 1538, the latter was filled by a volcanic eruption, when Monte Nuovo rose in its place, rendering the Averno again a separate lake. On its banks, instead of pestilential marshes, are now beautiful gardens and vineyards. Here was placed the grave of Hecate, and the grotto of the Cumæan sibyl is still to be seen here.

AVERRHOA (av-er-hō'a), a genus of plants, order *oxalidaceæ*. It consists of two species, both of which form small trees in the East Indies. They are remarkable for their leaves, which are pinnated, possessing, in a slight degree, the kind of irritability found in the sensitive plant; and for their fleshy oval fruits with five thick longitudinal wings. In the carambola (*A. aciambola*), the leaves are smooth, the flowers of a violet purple, and the fruit about the size of a goose's egg; it is of a pale yellow color, and is said to be agreeably acid in the East Indies. The other species, called the blimbing (*A. blimbi*), has downy leaves and fruit resembling the small cucumber. The latter is intensely acid and cannot be eaten raw. It is pickled and candied, or a syrup is obtained from it by boiling with sugar, and its juice is found an excellent agent for removing iron mold or other spots from linen. To the Malays it answers the same purposes as the citron, the gooseberry, the caper and the cucumber of Europe.

AVERROES (av-er-ō'az), or **AVERRHOES** (corrupted from EBN or IBN ROSHD or RUSHD), an Arabian philosopher and physician, born 1120. He succeeded his father in the chief magistracy of Cordoba, capital of the Moorish dominions in Spain; was afterward nominated chief judge in Morocco, and, having there appointed deputies to his office, he returned to Spain. The liberality of his opinions, however, caused him to be persecuted by the more orthodox Moslems, and he was imprisoned; but, after doing penance and making recantation, he was liberated. Averroes greatly admired Aristotle, and his commentaries on the writings of that philosopher procured for him the title of "The Commentator." Of the personal character of Averroes almost nothing is known. Like every Mohammedan, he cultivated jurisprudence; and, like every distinguished Arabian, he was devoted to poetry. He died at Morocco in 1198.

AVERY, SAMUEL, an American educator, born in Lamoille, Ill., in 1865. He graduated from Doane College in 1887. He took special courses in science at the University of Nebraska, and studied also at Heidelberg University, receiving the degree of Ph. D. in 1896. He was adjunct professor of chemistry at the University of Nebraska from 1896 to 1899, professor of chemistry and chemist at the Agricultural Experimental Station at the University of Idaho from 1899 to 1901, then returned to the University of Nebraska, and in 1905 was appointed chief professor of chemistry at that institution. During 1908 to 1909 he was appointed acting chancellor, and in the latter year chancellor of the University of Nebraska. He was a member of many scientific societies, the author of several reports on chemical subjects, a popular lecturer on educational topics, and was a member of the International Conciliation Commission with Sweden in 1914 and 1915.

AVESTA. See ZEND AVESTA.

AVEYRON (ä-vā-rôn), a department occupying the S. extremity of the central plateau of France, traversed by mountains belonging to the Cevennes and the Cantal ranges; principal rivers: Aveyron, Lot and Tarn, the Lot alone being navigable. The climate is cold, and agriculture is in a backward state, but considerable attention is paid to sheep breeding. It is noted for its Roquefort cheese. It has coal, iron, and copper mines, besides other minerals. Area, 3,340 square miles; capital, Rhodez. Pop. about 370,000.

AVIARY, a building or inclosure for keeping, breeding and rearing birds. Aviaries appear to have been used by the Persians, Greeks, and Romans, and are highly prized in China. In England they were in use at least as early as 1577, when William Harrison refers to "our costlie and curious aviaries." An aviary may be simply a kind of very large cage; but the term usually has a wider scope than this.

AVICENNIA, or WHITE MANGROVE, a genus of *verbenaceæ*, consists of trees or large shrubs resembling mangroves, and, like them, growing in tidal estuaries and salt marshes. Their creeping roots, often standing six feet above the mud in crowded pyramidal masses, and the naked asparagus-like suckers which they throw up, have a singular appearance. The bark of *A. tomentosa*, the white mangrove of Brazil, is much used for tanning. A green, resinous substance exuding from *A. resinifera* is eaten by the New Zealanders. The

genus is named in memory of the Arabian physician Avicenna.

AVIENUS, RUFUS FESTUS (av-ē-en'us), a Latin descriptive poet, who flourished about the end of the 4th century after Christ, and wrote "Descriptio Orbis Terræ," a general description of the earth; "Ora Maritima," an account of the Mediterranean coasts, etc.

AVIGNON (av-ēn-yôn') (ancient Avenio), a city of France, capital of the department of Vaucluse, on the left bank of the Rhone, 76 miles N. N. W. of Marseilles, on the railway to Paris. Avignon was for a long time the residence of the Popes. It is situated in a fine plain, and is surrounded by high walls, flanked with numerous towers. The ancient palace of the Popes stands on the declivity of a rock. It is a Gothic building of different periods, and of vast extent, and now serves as a prison, military depot, and barracks. The Cathedral Church of Notre Dame des Dons is very ancient, as is also the spire of the Church of the Cordeliers. The latter church contained the tomb of Laura, immortalized by Petrarch. Avignon existed before the Roman invasion, and afterward became a Roman colony. In 1309, Clement V. transferred thither the abode of the Popes, who continued to reside here till 1377, when they returned to Rome; but two schismatical Popes, or Popes elected by the French cardinals, resided in Avignon till 1409. Avignon and its territory remained the property of the Holy See until 1797, when it was incorporated with France. Pop. about 50,000.

AVILA (ä'vē-lä), a town of Spain, capital of the province of Avila, a modern division of Old Castile. It is the see of the bishop suffragan of Santiago, with a fine cathedral, and was once one of the richest towns of Spain. Principal employment in the town, spinning; in the province, breeding sheep and cattle. Pop. (province) about 200,000.

AVITUS, MARCUS MÆCILIUS, an Emperor of the West. He was of a Gaulish family in Auvergne, and gained the favor of Constantius, the colleague of Honorius, and of Theodoric, King of the Visigoths. He served with distinction under Ætius, became Prefect of Gaul, and concluded a favorable treaty with the Goths. He afterward retired into private life until the invasion of Attila, when he induced the Goths to join the Romans against the common enemy. Avitus was proclaimed Emperor in 455, took for his colleague Marcianus, and died the year following.

AVLONA, or VALONA, the chief seaport in Albania, in the province of Janina, on an eminence near the Gulf of Avlona, an inlet of the Adriatic, protected by the island of Sasseno, the ancient Saso. The independence of Albania was proclaimed here in 1912. Pop. about 6,000. See ALBANIA.

AVOCA, or OVOCA, a beautiful valley and river of Ireland, near Glendalough, in the county of Wicklow, and celebrated as being the scene which gave rise to one of the finest of Moore's "Irish Melodies."

AVOCADO, a West Indian fruit, called also avocado pear, alligator pear, subaltern's butter tree, avigato, and sabacca. It belongs to the order *lauraceæ* (laurels), and is the *persea gratissima*. It is found in tropical America. The fruit is about the size and shape of a large pear. A considerable part of it is believed to consist of a fixed oil. It is highly esteemed. The fruit itself is very insipid, on which account it is generally eaten with the juice of lemons and sugar to give it poignancy.

AVOCET, or AVOSET, the English name of a genus of birds, with their feet so webbed that they might seem to belong to the *natatores* (swimmers), but which, by the other parts of their structure, are placed in the family *scolopacidæ* (snipes), and the sub-family *totaninæ* (tattlers). Their great peculiarity is a long, feeble bill, curved upward, with which they explore the sand for prey. *Recurvirostra avocetta* is a British bird. It was formerly abundant in the fenny districts, but is now rare. *R. americana* differs from it by having a red cap; and there are a few other foreign species.

AVOGADRO'S LAW, in physics, asserts that equal volumes of different gases at the same pressure and temperature contain an equal number of molecules.

AVOIRDUPOIS, a system of weights used for all goods except precious metals, gems, and medicines, and in which a pound contains 16 ounces, or 7,000 grains, while a pound troy contains 12 ounces, or 5,760 grains. A hundredweight contains 112 pounds avoirdupois.

AVON, the name of several English and Scottish rivers, the best known of which is that Avon which rises in Northamptonshire, and flows into the Severn at Tewkesbury, after a course of 100 miles. On its banks is Stratford-on-Avon, the birthplace and abode of Shakespeare, who has hence been styled the Bard of Avon.

AVONDALE, a parish of Scotland, in the county Lanark. At the battle of Drumclog, fought near this place June 1, 1679, Grahame of Claverhouse, the famous Viscount Dundee, was defeated by the forces of the Scottish Covenant. A graphic description of this battle is found in Sir Walter Scott's "Old Mortality."

AWE, LOCH, a lake of Scotland, in Argyleshire, 18 miles N. W. of Inverary. It is 23 miles long, by 3 broad. On one of its many islands stand the magnificent ruins of Kilchurn Castle, for centuries the baronial fortress of the Campbells, Earls of Breadalbane. This lake receives the river Urchan; and at its N. W. extremity rises the great mountain of Ben Cruachan, 3,670 feet in height.

AX, or **AXE**, an instrument for cutting or chopping timber or smaller pieces of wood. As a rule, it is used with both hands, while a hatchet, which is smaller, is intended for one.

AXIL, in botany, the angle between the upper side of a leaf and the stem or branch from which it grows. Buds usually grow out from the stem in axils of leaves, and this position is naturally termed axillary. In anatomical terminology, the axilla is the armpit.

AXIM, an important station and port on the African Gold Coast, a little to the E. of the mouth of the Ancobrah river.

AXINITE, a triclinic mineral, called also yanolit and thumite. The crystals are broad with their edges sharp. It is found, both in its normal state and altered, in Europe and in the United States.

AXIOM, a Greek word meaning a decision or assumption, is commonly used to signify a general proposition which the understanding recognizes as true, as soon as the import of the words conveying it is apprehended. Such a proposition is, therefore, known directly, and does not need to be deduced from any other. Mathematicians used the word axiom to denote those propositions which they must assume as known from some other source than deductive reasoning, and employ in proving all the other truths of the science. The rigor of method requires that no more be assumed than are absolutely necessary. Every self-evident proposition, therefore, is not an axiom in this sense, though, of course, it is desirable that every axiom be self-evident; thus, Euclid rests the whole of geometry on 15 assumptions, but he proves propositions that are at least as self-evident as some that he takes for granted. Euclid's assumptions are divided into three postulates, or demands, and 12 common notions; the term axiom is of later introduction. The distinction between axioms and postulates is usually stated in this way: an axiom is "a theorem granted without demonstration;" a postulate is "a problem granted without construction"—as, to draw a straight line between two given points.

AXIS, a straight line, real or imaginary, passing through a body, and around which that body revolves, or at least may revolve; also, the imaginary line connecting the poles of a planet, and around which the planet rotates.

In geometry, an imaginary line drawn through a plane figure, and about which the plane figure is supposed to revolve, with the result of defining the limits of a solid.

In astronomy the axis of the earth or the axis of rotation of the earth, is that diameter about which it revolves. It is the one which has for its extremities the North and South Poles. The term is similarly used of the sun, the moon, and the planets. The axis of the celestial sphere is the imaginary line around which the heavens appear to revolve. The axis of an orbit is the major axis of the orbit of a planet, the line joining the aphelion and perihelion points. The minor axis is the line perpendicular to the former, and passing through the center of the ellipse.

In mechanics, the axis of suspension of a pendulum is the point from which it is suspended, and, consequently, around which it turns.

In optics, the axis of a lens is a line passing through the center of its curved, and perpendicular to its plane, surface.

In architecture, a spiral axis is the axis of a spirally twisted column. The axis of an Ionic capital is a line passing perpendicularly through the middle of the eye of the volute.

In geology an axis is an imaginary line on the opposite sides of which the strata dip in different directions. If the angle formed at their point of junction be a salient one, they form an anticlinal axis, or anticlinal; but, if it is a reentering one, then they constitute a synclinal axis, or synclinal.

In botany, the axis is that part of a plant around which the organs are symmetrically arranged. The ascending axis means the stem. The descending axis is the root. Recessory axes are axes in addition to the main one, found in the stems of calycanthus, chimonanthus, and some other plants. The appendages of

the axis are scales, leaves, bracts, flowers, sexes, and fruit. The axis of inflorescence is a peduncle which proceeds in a nearly straight line from the base to the apex of the inflorescence.

In anatomy, the axis of the body is the vertebral column, around which the other portions of the frame are arranged.

AXIS, a species of deer, the *cervus axis*, found in India. It is spotted like the fallow deer, from which, however, the adult males, at least, may be distinguished by their possessing round horns without a terminal palm. There are several varieties, if, indeed, they are not distinct species. All are called by Anglo-Indian sportsmen hog deer.

AXMINSTER, a market town of England, in the county Devon, on the Axe, at one time celebrated for its woolen cloth and carpet manufactures, and giving name to an expensive variety of carpet having a thick, soft pile, and also to a cheaper variety. Pop. about 3,000.

AXOLOTL (*amblystoma maculatum*), a curious Mexican amphibian, not unlike a newt, from 8 to 10 inches in length, with gills formed of three long, ramified or branch-like processes floating on each side of the neck. It reproduces by laying eggs. The axolotl is esteemed a luxury by the Mexicans. There are a number of species of *amblystoma* in North America.

AXUM, a town in Tigré, a division of Abyssinia, once the capital of an important kingdom, and at one time the great depot of the ivory trade in the Red Sea.

AYACUCHO (ä-yä-kö'chō), formerly Huamanga or Guamanga, a town in the Peruvian department of the same name, 220 miles E. S. E. of Lima. Founded by Pizarro in 1539, it is now a handsome and thriving town. Here, on Dec. 9, 1824, the combined forces of Peru and Columbia—the latter then comprising Ecuador, New Granada, and Venezuela—totally defeated the last Spanish army that ever set foot on the continent. Pop. about 300,000; town, about 10,000.

AYE-AYE, an animal of Madagascar, so called from its cry, now referred to the lemur family. It is about the size of a hare, has large, flat ears and a bushy tail; large eyes; long, sprawling fingers, the third so slender as to appear shriveled; color, musk-brown, mixed with black and gray ash; feeds on grubs, fruits, etc.; habits, nocturnal.

AYEEN, or **AKBERY**, a very valuable statistical description of the Mogul Empire as it was in the reign of Akbar. It was compiled by Abul Fazi, the Vizier of the Emperor Akbar. There is an English translation of it by Gladwin.

AYESHAH (ī-esh'a), also **AYSHA** or **AISHA**, the favorite wife of Mohammed, and daughter of Abu-Bekr, was born at Medina about 610 A. D., and was only nine years of age when the Prophet married her. She was the only one of Mohammed's wives who accompanied him in his campaigns. Although Ayeshah bore no children to Mohammed, she was tenderly beloved by him. She was accused of adultery, but Mohammed produced a revelation from Heaven (now in the Koran) to the effect that she was innocent. Mohammed expired in her arms (632). She now successfully exercised her influence to prevent Ali, the Prophet's son-in-law, from becoming caliph, and secured the succession for her father, Abu-Bekr. Again, on Othman's death, she headed a force to resist the accession of Ali, but the troops under her were in 656 defeated by Ali, and she was taken prisoner. She died at Medina (677 A. D.), highly venerated by all true Mussulmans, and named the Prophetess and the Mother of Believers.

AYLESFORD, a town and parish of England, in the county of Kent, 3 miles from Maidstone. In its vicinity is the remarkable monument called Kit's Coty House, a kind of Druidical cromlech of which the origin is obscure, and much contested among antiquaries.

AYOUBITES, or **AYYUBITES**, the Saracenic dynasty founded by Saladin, which in Egypt supplanted the Fatimite caliphs, about 1171 A. D. Several of the descendants of Saladin, known as Ayoubites, afterward ruled in Egypt, Syria, Armenia and Arabia Felix. In the 13th century their power was destroyed by the Mamelukes.

AYR (ār), a town of Scotland, a royal and parliamentary borough and capital of Ayrshire, at the mouth of the river Ayr, near the Firth of Clyde. It was the site of a Roman station. William the Lion built a castle here in 1197 and constituted it a royal borough in 1202; and the Parliament which confirmed Robert Bruce's title to the crown sat in Ayr. Two bridges connect Ayr proper with the suburbs of Newton and Wallacetown. One of the bridges, opened in 1879, occupies the place of the "new brig" of Burns' "Brigs of Ayr," the "auld brig" (built 1252) being still serviceable for foot traffic. Carpets and lace curtains are manufactured. There is a considerable shipping trade, especially in coals.

The house in which Burns was born is within 1½ miles of the town, and a monument to him stands on a height between the kirk and the bridge over the Doon. Pop. about 35,000.

AYRES, BROWN, an American educator, born in Memphis, Tenn., in 1856. He was educated at private schools, studied engineering at the Washington and Lee University and at the Stevens Institute of Technology, and also took post-graduate courses at Johns Hopkins University. He was professor of physics at the College of Technology of Tulane University from 1880 to 1904, and was dean of the college from 1894 to 1900. From 1900 to 1904 he was vice-chairman of the faculty, and from 1901 to 1904 was dean of the academic college. He was acting president of Tulane University in 1904 and in the same year was made president of the University of Tennessee. He was a member of several engineering societies and in 1910 was president of the National Association of State Universities.

AYRSHIRE, a county of Scotland, in the southwestern division. It has an area of 1,132 square miles. The county for the most part is hilly. It has important deposits of minerals, including coal, limestone, and freestone. Agriculture is highly developed and cattle raising has reached an advanced state. The leading manufactures are iron, textiles, and lace. There are also important fisheries and shipyards. The capital is Ayr. Other important towns are Kilmarnock, Ardrossan, and Dundonald. Pop. about 275,000.

AYTOUN, WILLIAM EDMONDSTOUNE, poet and prose writer, born at Edinburgh in 1813; studied at the University of Edinburgh, became a writer to the signet in 1835, and passed as advocate in 1840. He issued a volume of poems in 1832, by 1836 was a contributor to "Blackwood's Magazine," and he published the "Life and Times of Richard I." in 1845. In 1848 he published a collection of ballads entitled "Lays of the Scottish Cavaliers," which has proved the most popular of all his works. He also published the "Bon Gaultier Ballads" (parodies and other humorous pieces, in conjunction with Theodore Martin), 1855; in 1856 the poem "Bothwell," and in subsequent years by "Norman Sinclair," "The Glenmutchkin Railway," and other stories. In 1858 he edited a critical and annotated collection of the "Ballads of Scotland." A translation of the poems and ballads of Goethe was executed by him in conjunction with Theodore Martin. In 1845 he became Professor of Rhetoric and English Literature in the University of Edinburgh, a place he held till his death. In 1852 he was appointed sheriff of Orkney and Shetland. He died at Blackhills, Elgin, 1865.

AYUNTAMIENTO (ä-ön-tam-yen'to), the name given in Spain to the councils or governing bodies of towns. Sprung from the institutions of the Romans, and firmly established during the long struggles with the Moors, the ayuntamientos acquired great influence and political power, the nobility being admitted to them without their class privileges. The ayuntamiento, with the alcalde as president, was appointed by the free choice of the people. The government could provisionally annul its acts, but must afterward procure the ratification of the Cortes. The ayuntamientos were empowered to make up the lists of electors and jurors, to organize the national guards, to command the police within their own bounds, to direct the apportionment and raising of taxes, etc. The municipal law of 1870 deprived them of all political authority, and regulated them as administrative bodies, subject in certain respects to the authorities of the provinces, the law courts, and the Cortes.

AZALEA, a genus of plants belonging to the order *ericaceæ* (heathworts). Several foreign azaleas are cultivated in gardens and greenhouses on account of the abundance of their fine flowers, and, in some cases, their fragrant smell. There are numerous varieties of the species, and hybrids may be formed between azalea and the nearly-allied genus rhododendron. Azaleas are best cultivated in a peaty soil. The most delicate species is *azalea indica*.

AZEGLIO (ä-zāl'yō), **MASSIMO TAPARELLI, MARQUIS D'**, an Italian author, artist, diplomatist, and statesman, born at Turin, in 1801, was the descendant of an ancient and noble Piedmontese family. At the age of 14 he was excommunicated for an assault upon his teacher, who was an ecclesiastic. In 1816 he accompanied his father to Rome, where he studied painting and music. In 1830 he married the daughter of Manzoni, the great novelist, and wrote several romances. The earliest of these, "Ettore Fieramosca," published in 1833, found great favor. His next romance, "Niccolò de' Lapi," published eight years afterward, became equally popular, and is esteemed by Italian critics the best historical novel in any language. In 1842 Azeglio abandoned his favorite pur-

suits, and, with his friends, Balbo and Gioberti, he made a tour through the provinces of Italy, awakening the revolutionary spirit which troubled the last years of Gregory XVI. After the Revolution of 1848 he supported the cause of the King of Piedmont, and, at the head of the Papal troops, fought against the Austrians at Vicenza, where he was wounded. In 1849, Victor Emmanuel appointed him President of the Cabinet of Ministers, which office he resigned in 1852 to his political adversary, Count Cavour. In 1859, after the peace of Villafranca, he undertook a confidential mission as Ambassador Extraordinary to England; and was afterward appointed governor of the city of Milan. He died Jan. 15, 1866.

AZERBAIJAN, REPUBLIC OF. This new state of Transcaucasia had its birth in circumstances resulting from the World War. Its frontiers are not yet defined with precision, but it has an area of about 57,000 square miles in eastern Caucasia, is bounded on the south and east by Persia and the Caspian Sea, and on the north and west by Daghestan and Georgia. The population is mixed, though the bulk is of Iranian stock with a mixture of Tartars and Turks. After the overthrow of the Russian Czar and the establishment of the Soviet régime the people of Azerbaijan, together with those of Georgia and Russian Armenia, broke away from Russia and formed a joint state, April 22, 1918, which they styled the Federal Republic of Transcaucasia. The interests of the different peoples, however, were so divergent that the experiment came to an end in about five weeks. Georgia was swayed by German influences, the people of Azerbaijan were sympathetic with the Turks who were their co-religionists, while Armenia was strongly in favor of the Allied cause. The Transcaucasian Republic therefore dissolved into its component parts, May 26, 1918, and two days later Azerbaijan declared its own independence.

Baku, the great oil center and seaport of Azerbaijan, was at the time held by the Bolshevists, who in the early spring had captured it after a battle in which the natives lost 12,000 in killed. The new government which had established its seat at Elizabetpol appealed for aid to the Turks, and with the assistance of the latter retook Baku and drove back a Bolshevist army that was threatening Elizabetpol. The Azerbaijan Government then invited General Thomson, the commander of British troops stationed on Persian territory, to occupy Baku, for the sake of strengthening its defense. The request was acceded to, and British troops took possession of the town Nov. 17, 1918. At the end of 1919 the troops were withdrawn. The independence of Azerbaijan was acknowledged by the Allies in January, 1920.

The Azerbaijan Parliament consists of 120 members, elected by universal suffrage. Representatives of the various races in the state, Russians, Armenians, Poles, and Jews, are included in the membership. The members of the Cabinet are responsible to Parliament. The national budget for 1919 was put at 665,000,000 rubles. The great source of revenue for state purposes is the petroleum industry.

AZIMUTH, the angular distance of a celestial object from the N. or S. point of the horizon (according as it is the N. or S. pole which is elevated), when the object is referred to the horizon by a vertical circle. Or the angle comprised between two vertical planes, one passing through the elevated pole, the other through the object. It is generally reckoned eastward or westward, from the N. or S. point for 180° either way; but Herschel prefers always reckoning it from the points of the horizon most remote from the elevated pole westward, so as to agree in its general direction with the apparent diurnal motion of the stars. Of course, he therefore counts from 0° to 360°. Azimuths, called also vertical circles, are great circles intersecting each other in the zenith and nadir, and cutting the horizon at right angles in all the points thereof. On these are reckoned the altitude of the stars, and of the sun when he is not in the meridian. A magnetical azimuth is an arch of the horizon, contained between the sun's azimuth circle and the magnetical meridian; or it is the apparent distance of the sun from the N. or S. point of the compass.

AZORES, or WESTERN ISLANDS, a Portuguese archipelago, in the mid-Atlantic, between 36° 55′ and 39° 55′ N. lat. and between 25° 10′ and 31° 16′ W. long. Stretching over a distance of 400 miles, their nine islands are divided into three distinct groups—Sta. Maria and Saõ Miguel in the S. E.; Terceira, Saõ Jorge, Pico, Graciosa, and Fayal in the middle; and Flores and Corvo in the N. W. Of these, Flores lies 1,176 miles W. of Cape Rocca in Portugal, 1,484 S. W. of Falmouth, and 1,708 E. S. E. of Halifax. In 1431-1453 the Azores were taken possession of by the Portuguese. They were at that time

uninhabited; but that they had been visited by the Carthaginians is proved by Punic coins found on Corvo. They seem to have been known to the Arabian geographer Edrisi in the 12th century; and they are marked distinctly on a map of 1351. The Portuguese colonists called the whole group Azores, from *acor* or *azor*, a hawk; and they named two individual islands, Corvo and Saõ Jorge, from Corvi Marini and San Zorze, which, according to a map of 1375, had been previously seen in the Western ocean. In 1466 Alfonso V. made a life grant of the island of Fayal to his aunt, the Duchess of Burgundy, and from this circumstance many settlers migrated thither from Flanders.

The total area of the group is 919 square miles, and the pop. about 260,000. The capital is Angra, in Terceira; but Ponta Delgada, in Saõ Miguel, is a larger town. The Azores are of volcanic origin, and with the exception of Corvo, Flores, and Graciosa, are still liable to eruptions and violent earthquakes, the worst of 21 shocks since 1444 having been those of 1591, 1638, 1719, and 1841. Hot mineral springs are numerous; and the baths of Furnas, in Saõ Miguel, are much resorted to by invalids. The islands have a considerable trade in fruit with Portugal, England, Brazil, and other countries. The greatest want of the group is a good harbor. The Azores are regarded as a province, not a colony, of Portugal, and as belonging to Europe.

AZOTE, a name formerly given to nitrogen; hence substances containing nitrogen and forming part of the structure of plants and animals are known as azotized bodies. Such are albumen, fibrine, casein, gelatine, urea, kreatine, etc.

AZOTINE, a substance procured by decomposing wool by the action of steam at 150° C. under a pressure of five atmospheres; the product, afterward dried by evaporation, contains nitrogen completely soluble in water. Azotine is mixed with dried blood for a fertilizer.

AZOV, a town in the S. of Russia, on the left bank of the Don, 7 miles from its mouth. The inhabitants depend mostly on fish-curing. Pop. about 30,000. Azov was built 9 miles from the site of the ancient Greek colony of Tanaïs; and when, in the 13th century, it was taken possession of by the Genoese, they altered its name to Tana. They were driven out of it by Timur (Tamerlane) in 1392. In 1471 it was taken by the Turks, and in 1696 by Peter the Great; and it was finally ceded to Russia in 1774.

AZOV, SEA OF, named after the town, is a large gulf of the Black Sea, formed by the Crimean peninsula, or rather an inland lake connected with the Black Sea by the Strait of Yenikale or Kertch (ancient Bosporus Cimmerius), 28 miles long, and barely 4 wide at the narrowest. The intricate Siwash or Putrid Sea, which is just a succession of swamps, is cut off from the W. portion of the Sea of Azov by the long, narrow slip of low, sandy land called the Peninsula of Arabat. The ancient name of the Sea of Azov was Palus Mæotis or Mæotic marsh, from the Mæotœ dwelling on its shores; by the Turks it is called Balik-Denghis, or fish sea, from its abundance of fish. The water is almost fresh. The whole sea is shallow, from 3 to 52 feet deep; and measuring 235 by 110 miles, it occupies an area of 14,500 square miles. The largest river emptying into it is the Don. During the Crimean War, an expedition, having on board 16,500 English, French, and Turks, was sent to the sea in May, 1855, which bombarded the ports, and cut off supplies intended for Sebastopol.

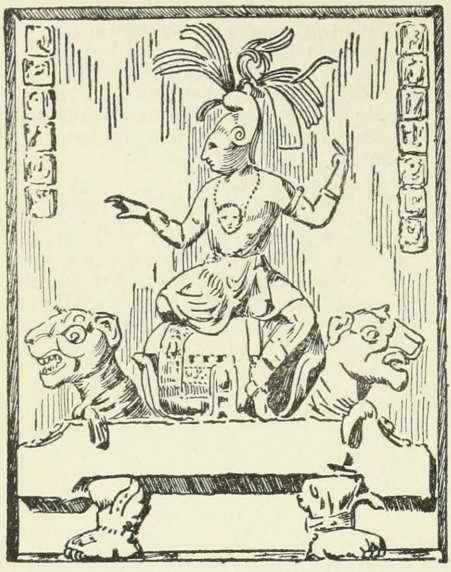
AZPEITIA (ath-pīt'ya), a town in the Spanish province of Guipuzcoa, in a fine valley on the Urola, 18 miles S. W. of San Sebastian. A mile from it is the famous convent of Loyola, now converted into a museum (1683). It comprises a tower of the Santa Casa, in which St. Ignatius of Loyola, the great founder of the Jesuits, was born in 1491. Here every year in July a great festival is held in his honor, to which pilgrims flock from all quarters.

AZRAEL, the name given to the angel of death by the Mohammedans.

AZREK, BAHR-EL, or the **BLUE RIVER**, the principal stream of Abyssinia, which, after a winding course through Abyssinia and Sennaar, falls into the Nile above Gerri.

AZTECS, a race of people who settled in Mexico early in the 14th century, ultimately extended their dominion over a large territory, and were still extending their supremacy at the time of the arrival of the Spaniards, by whom they were speedily subjugated. Their political organization, termed by the Spanish writers an absolute monarchy, appears to have consisted of a military chief exercising important, but not unlimited, power in civil affairs, in which the council of chiefs and periodic assemblies of the judges had also a voice. Their most celebrated ruler was Montezuma, who was reigning when the Spaniards arrived. Slavery and polygamy were both legitimate, but the children of slaves

were regarded as free. Although ignorant of the horse, ox, etc., they had considerable knowledge of agriculture, maize



AZTEC ALTAR PIECE IN THE TEMPLE AT PALENQUE

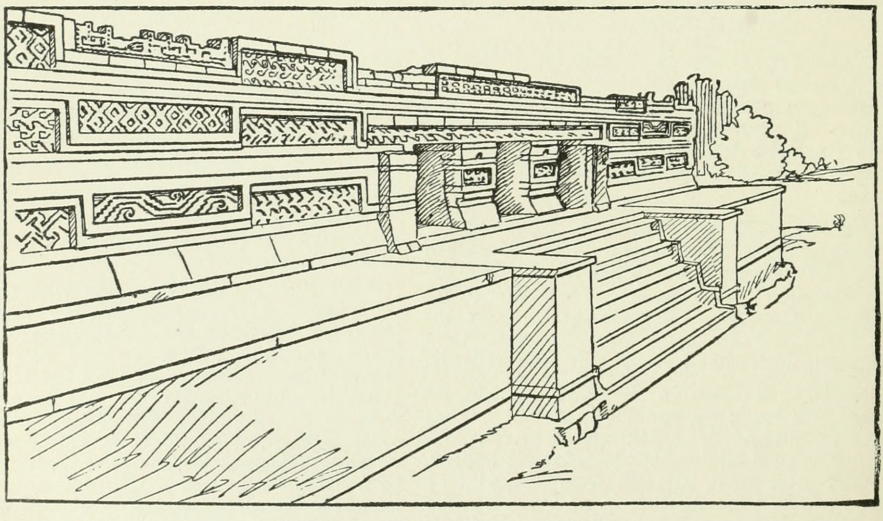
and the agave being the chief produce. Silver, lead, tin, and copper were obtained from mines, and gold from the

cord events they used an unsolved hieroglyphic writing, and their lunar calendars were of unusual accuracy. Two special deities claimed their reverence.



HINTZILOPOCHTLI, AZTEC GOD OF WAR

Hintzilopochtli, the god of war, propitiated with human sacrifices; and Quetzalcoatl, the beneficent god of light and air, with whom at first the Aztecs were



AZTEC PALACE AT MITLA, MEXICO

surface of river beds, but iron was unknown to them, their tools being of bronze and obsidian. In metal-work, feather-work, weaving and pottery they possessed a high degree of skill. To re-

disposed to identify Cortez. Their temples, with large, terraced, pyramidal bases, were in charge of an exceedingly large priesthood, with whom lay the education of the young. As a civilization

of apparently independent origin, yet closely resembling in many features the archaic Oriental civilizations, the Aztec civilization is of the first interest. Some of the Aztec descendants still retain their ancient language.

AZULINE, or **AZURINE**, blue dyes belonging to the coal-tar class.

AZUNI, DOMENICO ALBERTO (az-ö′nē), an Italian jurist, born in Sassari, Sardinia, in 1749. He became judge of the Tribunal of Commerce at Nice, and in 1795 published a work in which he endeavored to reduce maritime laws to fixed principles, and which appeared in French in 1805, under the title of "Droit Maritime de l'Europe." Napoleon appointed him one of the commissioners for compiling the new commercial code. He died Jan. 23, 1827.

AZURE, the heraldic term for the color blue, represented in engraving by horizontal lines.

AZURINE (*leuciscus cæruleus*), a fresh water fish of the same genus as the roach, chub and minnow; called also blue roach.

AZURITE, a mineral, called also lazulite; also a brittle, transparent, or subtranslucent mineral, with monoclinic crystals. The luster is vitreous, or verging on adamantine; the color azure-blue, passing into Berlin blue. It is found in England, as also in France, Austria-Hungary, and Siberia.

B

B, b, the second letter and the first consonant in the English alphabet, as it is also in the other languages of the Aryan family spoken in Europe. A sound and character corresponding to the English *b* and the Greek *beta* is the second letter and the first consonant in Phœnician, Hebrew, Samaritan, Aramaic, Arabic, and Koptic. In Ethiopic, however, *beth* stands tenth instead of second in order. Turning next to some of the Aryan languages of Asia, we find that in Armenian *be* is the 26th of the 38 letters; and in Sanskrit, Mahratta, etc., *bu*, or *ba*, is generally placed 23d in the list of consonants, where it is preceded by *phu* and followed by *bha*. Returning again to the Semitic, *beth*, the name given to the second letter of the Hebrew alphabet, is really Aramæan. Like the corresponding word in Hebrew, *baith*, it signifies *a house*, to which it has some faint resemblance.

B is a flat mute, the voice not being so entirely shut off in pronouncing it as it is when one of the sharp mutes, *p* or *f*, is uttered. The *b* sound is produced by compressing the lips, a vowel being added to render it audible. It is hence called a labial, from Latin *labium*=a lip, plural *labia*=lips; its other associates in the same category being *p*, *f*, and *v*, with which it is often interchanged in the cognate languages.

B, as an initial, is used—

In designating university degrees:

For Latin *Baccalaureus*, as *Artium Baccalaureus*=Bachelor of Arts=B. A.

In music: For bass.

In chemistry: For the element boron.

B, as a symbol, is used—

In numeration, in Greek, Hebrew, Arabic, and even occasionally in English, for 2. But B, in Greek, is the diacritical mark for 2,000. In Latin B stands for 300, and $\bar{B}$ for 3,000.

In music: As the seventh note of the diatonic scale. It answers to the Italian and French *si*. In Germany it is=B flat.

BAAL, the chief male divinity among the Phœnicians, as Ashtoreth was the leading female one. The Carthaginians, who sprang from the Phœnicians, carried with them his worship to their new settlements, as is proved, among other evidence, by the names of some of their world-renowned heroes: thus Hannibal, written in Punic inscriptions, Hannibaal, signifies the grace of Baal; and Hasdrubal, or Asdrubal, Azrubaal="Help of Baal." The worship of Baal early existed among the Canaanites and the Moabites, whence it spread to the Israelites, becoming at last for a time completely dominant among the 10 tribes, and to a certain extent even among the two, in consequence of the ill-advised marriage of Ahab with Jezebel, daughter of Ethbaal (the name means "with Baal"), King of Sidon. A number of places in Palestine and the neighboring countries commence with Baal, such as Baal-gad, Baal-meon, etc. This divinity seems to have symbolized the sun, and less frequently the planet Jupiter. He was worshipped under different forms, or in different relations: thus there were Baal-berith=the Covenant Baal, or lord; Baal-zebub=the fly-lord; Baal Peor=the Baal of Mt. Peor, or Baal of the opening, the Moabitish national divinity. There was an affinity between Baal and Moloch. The Beltein or Beltane fires, lit in early summer in Scotland and Ireland, seem to be a survival of Baal's worship.

BAALBEK (ancient Heliopolis, city of the sun), a place in Syria, in a fertile valley at the foot of Antilibanus, 40 miles from Damascus, famous for its magnificent ruins. Of these, the chief is the temple of the Sun, built either by Antoninus Pius or by Septimius Severus. Some of the blocks used in its construction are 60 feet long by 12 thick; and its 54 columns, of which 6 are still standing, were 72 feet high and 22 in circumference. Near it is a temple of Jupiter, of smaller size, though still larger than the Parthenon at Athens,

and there are other structures of an elaborately ornate type. Originally a center of the sun-worship, it became a Roman colony under Julius Cæsar, was garrisoned by Augustus, and acquired increasing renown under Trajan as the seat of an oracle. Under Constantine its temples became churches, but after being sacked by the Arabs in 748, and more completely pillaged by Tamerlane in 1401, it sank into hopeless decay. The work of destruction was completed by an earthquake in 1759.

BAAL-ZEBUB. Evil spirit; Beelzebub.

BABA, a Turkish word, signifying father, originating, like our word papa, in the first efforts of children to speak. In Persia and Turkey it is prefixed as a title of honor to the names of ecclesiastics of distinction; it is often affixed in courtesy, also, to the names of other persons, as Ali-Baba.

BÁBA BÚDAN (bä-bä bö-dan′), a spur of the West Ghâts, Mysore, India, which strikes E. for 15 miles, leaving a narrow opening at its W. end for the passage of the Bhadra, then S. in an unbroken line for 20 miles, inclosing between itself and the main chain of the Ghâts a rich, but unhealthy valley. To this spur belong three peaks above 6,000 feet high, among these Mulaina-giri, 6,317 feet, the highest in the West Ghâts. Coffee was first planted in India on another part of this spur toward the close of the 17th century, by a Mohammedan saint named Bába Búdan.

BABBAGE, CHARLES, an English mathematician, born near Teignmouth, Devonshire, Dec. 26, 1792; was Professor of Mathematics at Cambridge (1828-1839), and one of the founders, secretaries, and vice-presidents of the Astronomical Society. He is best known as the inventor of a calculating machine. His principal work was "On the Economy of Machinery" (1832), which was translated into several languages. He died in London, Oct. 18, 1871.

BABBITT, IRVING, an American educator, born in Dayton, O., in 1865. He graduated from Harvard University in 1889 and after post-graduate courses at Harvard he studied in Paris for several years. He was instructor of Romance languages in Williams College in 1894, and later successively instructor, assistant professor, and professor of French literature in Harvard University. He was the author of "Literature and the American College" (1908); "Masters of Modern French Criticism" (1912); etc. He edited the works of several French writers and was a frequent contributor to magazines.

BABBITT METAL, a soft metal resulting from alloying together certain proportions of copper, tin, and antimony, used with a view of obviating, as far as possible, friction in the bearings of journals, cranks, axles, etc. Invented by Isaac Babbitt.

BABEL, a place or circumstances in which confusion of sounds—as, for instance, by several people speaking at once—is the predominating characteristic. The reference is to the confusion of tongues divinely sent in consequence of the building of the Tower of Babel (Gen. xi: 1-9). The magnificent temple of Belus, asserted to have been originally this tower, is said to have had lofty spires, and many statues of gold, one of them 40 feet high. In the upper part of this temple was the tomb of the founder, Belus (the Nimrod of the sacred Scriptures), who was deified after death.

BAB-EL-MANDEB (*i. e.*, the gate of tears), so called from the danger arising to small vessels from strong currents, is the name of the strait between Arabia and the continent of Africa, by which the Red Sea is connected with the Gulf of Aden and the Indian Ocean. Within the strait, but nearer to Arabia, lies the bare, rocky island of Perim, since 1857 occupied by the British as a fort; its guns command the entrance to the Red Sea.

BABER (or "The Tiger"), the historical surname of Zehir-ed-din-Mohammed, the conqueror of Hindustan and founder of the so-called Mogul dynasty. Baber was of mixed Turkish and Mongol origin, being descended from Timour the Great on the father's side, and from Genghis Khan on the mother's. Baber was born on Feb. 14, 1483, and at the age of 12, on his father's death, ascended the insecure throne of Ferghana in Turkestan; soon after he was attacked on all sides by his uncles and other neighboring princes. Accordingly, at the age of 15, Baber seized on Samarcand, the capital of Timour, but, while thus engaged, a revolution at home deprived him of his sovereignty. After many years of an adventurous career, he raised an army, entered Hindustan, and was met by Ibrahim, the ruling Sultan of that country. The two armies fought the battle at Paniput, which decided the fate of India, on April 21, 1525. Baber, with his army of 12,000 men, completely overthrew that of Ibrahim, numbering 100,000, and entered Delhi in triumph. In the battle of Sakri, in February, 1527, Baber ut-

terly defeated the opposing Hindu princes, and then proclaimed himself Padishah, or Emperor of Hindustan. After a rule of four years, he died near Agra, Dec. 26, 1530.

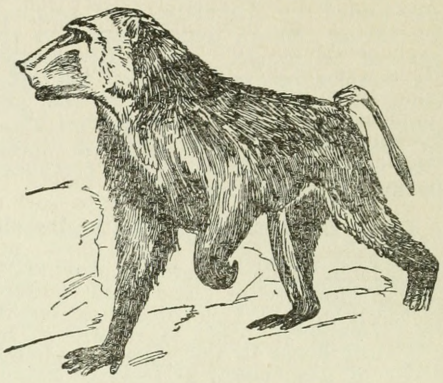
BÂBI (bä-bē'), the name of a modern Persian sect, derived from the title, Bâb-ed-Din (gate of the faith), assumed by its founder, Mirza Ali Mohammed, a native of Shiraz, who, in 1843, after a pilgrimage to Mecca, undertook to form a new religion from a mixture of Mohammedan, Christian, Jewish, and Parsee elements. The sect soon became numerous, and were not molested by the reigning Shah; but on the accession of Nasir-ed-Din in 1848, apprehending persecution, they took up arms, proclaiming the advent of the Bâb as universal sovereign. Several Persian armies were routed, but finally the insurgents were reduced by famine, and most of them executed (1849-1850). The Bâb had held aloof from the revolt, but he was arrested and put to death in 1850. His successor was recognized in the youthful son of the Governor of Teheran, who retired to Bagdad. An attempt of three believers to assassinate the Shah, in 1852, led to terrible persecution of the sect. Bâbism has nevertheless gained in strength, and is at present widely diffused in Persia. Their doctrines form a system of Pantheism. Bâbism enjoins few prayers, and those only on fixed occasions; encourages hospitality and charity; prohibits polygamy, concubinage, and divorce; discourages asceticism and mendicancy; and directs women to discard the veil, and share as equals in the intercourse of social life.

BĂBĬROÛSSA (bab-i-rös'a), a species of hog, sometimes called the horned hog and the hog deer, from the fact that its upper tusks, which are of great length and curved in form, piercing through the upper lip, grow upward and backward, like the horns of a ruminant.

BÂBISM. See BÂBI.

BABOO, or **BABU**, a Hindu title of respect equivalent to sir or master, usually given to wealthy and educated native gentlemen, especially of the mercantile class. In its modern use it is applied chiefly to native clerks able to write English.

BABOON, a common name applied to a division of Old World quadrumana (apes and monkeys), comprehending the genera *cynocephalus* and *papio*. They have elongated abrupt muzzles like a dog, strong tusks, or canine teeth, usually short tails, cheek-pouches, small, deep eyes, with large eyebrows, and naked callosities on the buttocks. They live on fruits and roots, eggs and in-



BABOON

sects. They include the chacma, drill, common baboon, and mandrill. The chacma, or pig-tailed baboon (*cynocephalus porcarius*) is found in considerable numbers in parts of the south African colonies. The common baboon (*C. babouin*) inhabits a large part of Africa farther to the N. It is of a brownish-yellow color, while the chacma is grayish black, or in parts black. The hamadryas (*C. hamadryas*) of Abyssinia is characterized by long hair, forming a sort of shoulder cape. The black baboon (*C. niger*) is found in Celebes.

BABSON, ROGER WARD, an American statistician, born in Gloucester, Mass., in 1875. After graduating from the Massachusetts Institute of Technology in 1898, he established a statistical organization at Wellesley Hills, Mass., with branch offices in many cities of the United States and in London, for furnishing statistical information. He was a well-known lecturer on statistics and economics, and acted in the special capacity of statistical adviser to the Government during the World War. He wrote much on money and investment, and was the publisher of "Moody's Manual of Railroad and Corporation Securities."

BABUYANES (ba-bö'ya-nes), or **MADJICOSIMA ISLANDS** a number of islands lying about 30 miles N. of Luzon, and generally considered the most northern of the Philippines. They are subject to the Loo-Choo Islands; aggregate pop. about 13,000.

BABYLON, the capital of Babylonia, on both sides of the Euphrates, one of the largest and most splendid cities of the ancient world, now a scene of ruins.

and earth-mounds containing them. Babylon was a royal city 1,600 years before the Christian era; but the old city was almost entirely destroyed in 683 B. C. A new city was built by Nebuchadnezzar nearly a century later. This was in the form of a square, each side 15 miles long, with walls of such immense height and thickness as to constitute one of the wonders of the world. It contained splendid edifices, large gardens and pleasure-grounds, especially the hanging gardens, a sort of lofty terraced structure. After the city was taken by Cyrus in 538 B. C., and Babylonia made a Persian province, it began to decline, and had suffered severely by the time of Alexander the Great. He intended to restore it, but was prevented by his death, which took place here in 323 B. C.

Interesting discoveries have been made on its site in recent times. The modern town of Hillah is near the ancient city, and the plain here for miles around is studded with vast mounds of earth and imposing ruins. The German Oriental Society has sent a number of expeditions to explore the ruins of storied Babylon, the city of Nebuchadnezzar. At Easter, 1899, the work was begun on the mound that covers ancient Babylon. It was the beginning of bringing to life the so-called "City of Life," which had been dead to the world for 3,000 years or more. Herodotus, who visited Babylon in the time of Artaxerxes I., said that the city was surrounded by a wall 50 royal ells (84 feet) wide, and 200 ells (336 feet) high, and that on top of this wall, on each edge, were one-story houses, leaving a space between the rows of houses on which four chariots abreast could drive. As soon as Dr. Koldewey, the leader of the first expedition, made his first attack on the mound, he struck this wall, undoubtedly the one mentioned by Herodotus. In April, 1900, Dr. Koldewey discovered a canal, built of Aramean brick, which is believed to be the long sought East Canal. A temple called Ernach, of the goddess Ninniach, was laid bare, and stones found inscribed from the time of Nebuchadnezzar. As a result of these and further discoveries many ancient references to Babylon have now assumed new meaning.

BABYLONIA (now Irak Arabi), an old Asiatic empire, occupying the region watered by the lower course of the Euphrates and the Tigris, and by their combined stream. The inhabitants, though usually designated Babylonians, were sometimes called Chaldeans. At the earliest period of which we have record, the whole valley of the Tigris and Euphrates was inhabited by tribes of Turanian or Tartar origin. Along with these, however, there early existed an intrusive Semitic element, which gradually increased in number till at the time the Babylonians and Assyrians (the latter being a kindred people) became known to the western historians they were essentially Semitic peoples. The great city of Babylon, or Babel, was the capital of Babylonia, which was called by the Hebrews Shinar. The chief cities, besides Babylon, were Ur, Calneh, Erech, and Sippara. Babylonia and Assyria were often spoken of together as Assyria.

The discovery and interpretation of the cuneiform inscriptions have enabled the history of Babylonia to be carried back to about 4000 B. C. The country was then ruled by a number of kings or princes, each in his own city. About 2700 B. C., Babylonia came under the rule of a single monarch. Latterly it had serious wars with neighboring nations, and for several hundred years previous to 2000 B. C. Babylonia was subject to the neighboring Elam. It then regained its independence, and for 1,000 years it was the foremost state of western Asia in power, as well as in science, art, and civilization. The rise of the Assyrian empire brought about the decline of Babylonia, which latterly was under Assyrian domination, though with intervals of independence. Tiglath-Pileser II. of Assyria (745-727) made himself master of Babylonia; but the conquest of the country had to be repeated by his successor, Sargon, who expelled the Babylonian King, Merodach-Baladan, and all but finally subdued the country, the complete subjugation being effected by Sennacherib. After some 60 years, the second or later Babylonian empire arose under Nabopolassar, who, joining the Medes against the Assyrians, freed Babylon from the superiority of the latter power, 625 B. C. The new empire was at its height of power and glory under Nabopolassar's son Nebuchadnezzar (604-561), who subjected Jerusalem, Tyre, Phœnicia, and even Egypt, and carried his dominion to the shores of the Mediterranean and northward to the Armenian Mountains. The capital, Babylon, was rebuilt by him, and then formed one of the greatest and most magnificent cities the world has ever seen. He was succeeded by his son, Evil-Merodach, but the dynasty soon came to an end, the last King being Nabonetus, or Nabonadius, who came to the throne in 555 B. C., and made his son, Belshazzar, co-ruler with him. Babylon was taken by Cyrus, the

Persian monarch, in 538, and the second Babylonian empire came to an end, Babylonia being incorporated in the Persian empire. Its subsequent history was similar to that of ASSYRIA (*q. v.*).

The account of the civilization, arts, and social advancement of the Assyrians already given in the article Assyria, may be taken as generally applying also to the Babylonians.

BABYLONIAN CAPTIVITY, a term usually applied to the deportation of the two tribes of the kingdom of Judah to Babylon by Nabuchadnezzar, 585 B. C. The duration of this captivity is usually reckoned 70 years, though, strictly speaking, it lasted only 56 years. A great part of the 10 tribes of Israel had been previously taken captive to Assyria.

BACCARAT (bä-kä-rä′), a town of France, in the department of Meurthe-et-Moselle, having the most important plate glass works in France. Pop. of commune about 7,500.

BACCARAT, or **BACCARA**, a game played with the ordinary playing cards. Any number of players may participate, and as many packs of cards may be used as necessary, the number being increased to correspond with the number of players. One member of the party is selected to act as banker. He deals out the cards from a box, after they have been shuffled. The face cards each count 10, and the others according to the numbers of their spots. After the bets have been made, the banker deals two cards to each of the players, including himself, but the other players must receive their cards before the banker is served. The aim of the players is to make the numbers 9, 19, 29, or as nearly those as possible, as 8, 18, and 28. Any player is at liberty either to "stand" or to be "content" with the two cards at first dealt, or to call for more, at the risk of exceeding 29, when his stake is forfeited to the dealer. If, after the first distribution of two cards to each, any player has a "natural"—*i. e.*, a sum making 9, or next in value, 19—he declares it wins, and the banker pays all who hold superior hands to his own, and claims from those holding inferior hands. The players stake their money separately, there being, in fact, as many separate games in progress as there are players, and the spectators may wager their money on any one of them, all of which must be accepted by the banker. Prior to the banker making a start, he states the amount of the bank. Anyone sitting down at the table has the right to call the whole of the bank, selecting the left or the right on which to pick up the cards. Previous to the banker dealing the cards, it is the duty of two croupiers, one on the right and the other on the left, to count up the stakes deposited on either side, and then make up the bank. Thus the banker knows, to the smallest coin, the exact amount of his liabilities.

BACCHANALIA, or **DIONYSIA**, feasts in honor of Bacchus, or Dionysos, characterized by licentiousness and revelry, and celebrated in ancient Athens. The Bacchantes of both sexes were clothed in fawn-skins, crowned with ivy, and bore in their hands *thyrsi*, that is, spears entwined with ivy. These feasts passed from the Greeks to the Romans, who abolished them in B. C. 186.

BACCHANTE (bak-an′tē), a person taking part in revels in honor of Bacchus.

BACCHIGLIONE (bak-il-yō′-na), a river of northern Italy, rises in the Alps, passes through the towns of Vicenza and Padua, and enters the Adriatic near Chioggia, after a course of about 90 miles.

BACCHUS (bak-us), the god of wine, son of Zeus (Jupiter) and Semele. He first taught the cultivation of the vine and the preparation of wine. His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality. In art he is usually represented crowned with wine leaves, and a mantle is hung negligently around his shoulders; sometimes a fawn-skin hangs across his breast. He is often accompanied by sileni, bacchantes, satyrs, etc.

BACCHYLIDES (bak-il′ē-dēs), a Greek poet, a native of Julis, a town on the island of Cos. He was a cousin of the still more famous lyric poet Simonides, with whom he remained for some time at the court of Hiero and Sicily. He traveled also in the Peloponnesus. He is said to have been a rival of Pindar. He flourished about 470 B. C. In 1895 a well-preserved text of his poems was discovered and published, and Bacchylides has now taken a permanent place as a master of Greek verse.

BACCIFEROUS (bak-sif′er-us), a term applied to those trees that bear berries. They are of four kinds: (1) Such as bear a caliculate, or naked berry; the flower and calix both falling off together, and leaving the berry bare; as the sassafras trees. (2) Such as have a naked monospermous fruit; that is, containing in it only one seed; as the arbutes. (3)

Such as have but polyspermous fruit; that is, containing two or more kernels or seeds within it; as the jesminum, ligustrum. (4) Such as have their fruit composed of many acini, or round, soft balls, set close together, like a bunch of grapes; as the uva marina.

BACH, JOHANN SEBASTIAN, a celebrated musician, born at Eisenach, upper Saxony, March 21, 1685. When he was 10 years old his father, who was a musician at Eisenach, died, and Bach sought the protection of an elder brother, who, dying soon after, he was again left destitute, and, to earn a livelihood, entered the choir of St. Michael's, Lüneburg, as a soprano singer. In 1703 he became court musician at Weimar, the following year organist at Arnstadt, and in 1708 court organist at Weimar. While holding this office he labored to make himself master of every branch of music. In 1717 he was made Director of Concerts, and six years afterward Director of Music and Cantor to St. Thomas' School, Leipsic, an appointment which he held to his death. About 10 years later the distinctions of kapellmeister to the Duke of Weissenfels and court composer to the King of Poland were conferred upon him. Bach, who had a son in the service of Frederick the Great, received a pressing request to visit Potsdam, on the occasion of a concert there. He went, and acquitted himself to the satisfaction of that monarch, some of whose music he played at first sight. Bach's close studies affected his eyes, and an operation left him totally blind and hastened his death, in Leipsic, July 28, 1750. With the exception of Handel, Bach had no rival as an organist.

BACHELLER, IRVING, an American novelist, born in Pierpont, N. Y., Sept. 26, 1859. He was graduated at St. Lawrence University in 1879 and became a reporter of the Brooklyn "Times." Subsequently he established a newspaper syndicate. His novels include "The Master of Silence"; "The Unbidden Guest"; "Eben Holden"; "The Master" (1908); "The Light in the Clearing" (1916); "A Man for the Ages" (1920).

BACHELOR, a term applied anciently to a person in the first or probationary stage of knighthood who had not yet raised his standard in the field. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college or university; or a man of any age who has not been married. A knight bachelor is one who has been raised to the dignity of a knight without being made a member of any of the orders of chivalry such as the Garter or the Thistle.

BACHELOR'S BUTTONS, the double flowering buttercup (*ranunculus acris*), with white or yellow blossoms, common in gardens.

BACHIAN (bäch'an), or **BATJAN**, one of the Molucca Islands, immediately S. of the equator, S. W. of Gilolo; area, 914 square miles. Pop. about 15,000. It is ruled by a native Sultan under the Dutch.

BACILLARIA, a genus of microscopic algæ belonging to the class *diatomaceæ*, the siliceous remains of which abound in Cretaceous, Tertiary, and more recent geological deposits.

BACILLUS, a name given to certain filiform bacteria present in the blood and tissues in malignant pustule, typhus, tuberculosis, and many other diseases. See BACTERIA.

BACKGAMMON, a game of chance and calculation. It is played by two persons, with two boxes, and two dice, upon a quadrangular table, or board, on which are figured 24 points, or *flèches*, of two colors, placed alternately. The board is divided into four compartments, two inner and two outer ones, each containing six of the 24 points (alternate colors). The players are each furnished with 15 men, or counters, black and white. These are arranged upon the board in the following manner: To play into the left hand table, two of your men are placed upon the ace-point of your opponent's inner table, five upon the sixth point in his outer table, three upon the cinque-point in your own outer table, and five upon the sixth point in your own inner table. The adversary's men are to be placed in corresponding order, in a position directly opposite. The game consists in moving your men from point to point, so as to bring them around into your own inner table (*i, e.*, that on your left hand), and then moving or bearing them off the board. The player who first clears off his men wins. The moves of the men are determined by the throws of the dice, according to the directions for playing. It will there be seen that the most advantageous throw at the outset is that of aces, as it blocks the bar, or sixth point in your outer table, and secures the cinque-point in your inner table, so that your adversary's two men cannot move if he throw either quarter, cinque, or size. This throw is frequently contested by inferior players, at the commencement of the game, by way of odds.

As the grand object of the game consists in bringing around your men into your own inner table, all throws that contribute toward that end, and prevent your adversary from doing the same, are advantageous, and *vice versa*. Each party plays into one of the tables on his own side; thus, if black plays into his left hand table, white plays into his right (*i. e.*, that which is exactly opposite) and *vice versa*, their men advancing in contraposition to each other. For right of first play each party throws a single die; he who throws the highest number wins, and may, if he chooses, adopt and play the joint number of the preliminary throw.

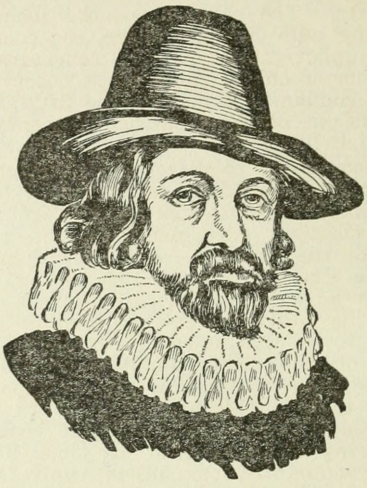
BACK RIVER, a name for the Great Fish River of northern Canada, discovered by Capt. Back in 1834 and by him traced down to its mouth under great difficulties.

BACKUS, TRUMAN JAY, an American educator, born in Milan, N. Y., Feb. 11, 1842; was graduated at the University of Rochester in 1864; and became President of the Packer Collegiate Institute in Brooklyn, N. Y. His publications include "Great English Writers," "Outlines of English Literature," and a revised edition of Shaw's "History of English Literature." He died March 24, 1908.

BACOLOR (bak'o-lôr), a town in the island of Luzon, Philippine Islands; 30 miles N. W. of Manila; was the capital of the Philippines during the British invasion in 1762, when the Spaniards feared a bombardment and seizure of Manila; and was a scene of military activity in the American operations against the Filipino insurgents in 1899. Pop. about 15,000.

BACON, a word applied to the sides of a pig which have been cured or preserved by salting with salt and saltpeter and afterward drying with or without wood smoke. The nitrogenous, or flesh forming, matter in bacon is small, one pound of bacon yielding less than one ounce of dry, muscular substance, while the amount of carbon compounds, or heat givers, is large, exceeding 60 per cent.

BACON, FRANCIS, English philosopher and statesman, born Jan. 22, 1561; youngest of eight children of Sir Nicholas Bacon, Lord Keeper. His mother, whom he resembled, was the sister of Lady Burghley and a woman of fine education and strong character. In his twelfth year Francis entered Trinity College, Cambridge, but left in June, 1576, to begin the study of law at Gray's Inn. Three months later he went to France in the entourage of Sir Amyas Paulet, the representative of the English Government. Here he laid the foundation of his interest in matters of state. The death of his father left him in poverty, with his own way to make. In 1582 he was again at Gray's Inn. He entered Parliament in 1584, and wrote a letter to the Queen in which he urged strong repression of the Catholic party and foresaw the conflict with Spain. His chief interest, however, was in the field of learning. He had previously expressed dislike for the university course, dominated by scholastic methods that prevented either additions to knowledge or fit training for the service of the state. In 1592 he wrote the famous letter to Burghley in which he said that he had taken all learning to be his province and laid down the foundations on which all his later work was to be based: "industrious observation, grounded conclusions, and profitable inventions and discoveries," that is, a method of research capable of immediate application to life in the place of repetition of theories traditional for centuries.



FRANCIS BACON

In 1597 he issued a slender volume of "Essays," which he described as "certain brief notes set down rather significantly than curiously." Later editions, each time with considerable additions, appeared in 1612 and in 1625. The ten essays of the first edition are written in simple and concise style, and are applications of common sense to everyday problems. The volume of 1612, with twenty-nine additions, is on loftier subjects, such as Goodness, Beauty, Empire, Death, the Greatness of Kingdoms.

These essays abound in evidences of his study of "the architecture of fortune," a philosophy of success. The essays of the third edition, written after his fall, are more philosophical and contain his ripest wisdom. The shrewdness, the concrete dealing with human nature, the concise and aphoristic style, the concentrated wisdom of one of the keenest observers, have combined to make these fifty-eight essays one of the great achievements of English literature.

Bacon's rise to power was very slow. Essex had been long interested in him, but was unable to get his protégé any high position. As a member of the counsel for the Queen he was a participant in the trial of Essex in 1601, a fact for which he has been much criticized. In 1605 his "Advancement of Learning" appeared. In this he carried out in detail some of the youthful ambitions expressed in his letter to Burghley and anticipated most of the philosophy afterward developed in many writings. The book is a survey of learning in his time, filled with acute criticisms of the university course, estimating the accomplishment in all fields of learning, pointing out what needed to be done and the method to be used, and treating the philosophy of success as well as traditional matters. It shows great learning, tremendous vitality, and contains many ideas on the method of research and the function of the college course that are of value today. His praise of learning, found in many passages, is eloquent, marked by lofty imagination and by the passion of a lover. His object was not merely to reach the attention of professional students, but to touch the imagination of men of all sorts and conditions, so that they might look upon research as one of the loftiest of human interests.

Not until his forty-sixth year did fortune smile on him. In 1607 he became Solicitor-General. Ten years later he was Lord Keeper; in 1618 Lord Chancellor; in 1621 Viscount St. Albans. He worked with enormous energy. His worldly success and the tremendous official burdens that accompanied it did not put an end to his activities in behalf of learning. In 1620 his "Novum Organum," or new method, appeared, having been prepared for by numerous writings carried on through busy years. His desire was to lead men to use an inductive method in research. He pointed out the way through which modern science has won its triumphs.

At the very pinnacle of his fame, he became the victim of the rising moral sense of the time and of the popular dislike of the corruption of the court. He was accused of accepting bribes, was tried and convicted, and Parliament imposed on him a sentence of imprisonment, a fine of £40,000, and expulsion from all public office. There is no evidence that his judgments had been influenced by the gifts that were a convention of the time. He recognized the justice of his sentence, but maintained that he had been uncorrupted. He was fond of extravagance and display, and these qualities together with his long study of the art of rising seem to have blunted his moral sense. They also inspired envy, and it should be added that the increasing unpopularity of the King and of his favorite, Buckingham, hastened the crisis.

After his fall, Bacon turned once more to his studies. His "History of Henry VII." (1622) was a pioneer in modern philosophical history. Several scientific works were completed; he revised and expanded his "Essays"; and carried on a series of scientific researches. He died April 9, 1626. The enigma of his character; the tragedy of his fall, almost in a day, from the highest worldly fame to disgrace; the enormous energy of his mind and will; his mastery of English prose; the immense stimulus he gave to learning, and is still capable of giving—all these indicate the extraordinary achievement of one of the greatest men of a great period in human history.

BACON, JOSEPHINE DODGE DASKAM, American authoress, born in Stamford, Conn., Feb. 17, 1876. She graduated from Smith College in 1898 at the head of her class. She has been a prolific writer of books and magazine articles, and is especially happy in her studies of juvenile and adolescent types.

BACON, LEONARD, an American clergyman, born in Detroit, Mich., Feb. 19, 1802; educated at Yale and Andover. In 1825 he became pastor of the First Congregational Church in New Haven. He was Professor of Didactic Theology in Yale (1866-1871). He was an active opponent of slavery. In 1847 he joined with Drs. Storrs and Thompson to found the New York "Independent." He published "Views and Reviews" (1840); "Slavery Discussed in Occasional Essays" (1846), and "Genesis of the New England Churches." He died in New Haven, Conn., Dec. 24, 1881.

BACON, ROBERT, an American financier and public official, born in Boston in 1860. He graduated from Harvard University in 1880 and entered the banking house of Lee, Higginson & Co. in Boston in 1881. In 1894 he became a member of the firm of J. P. Morgan & Co., New York, remaining until 1903.

From 1905 to 1909 he was Assistant Secretary of State and for three months in the latter year was Secretary of State, succeeding Elihu Root. He was ambassador to France from 1909 to 1912. During the World War was a major in the United States Reserves and served with the staff of General Pershing. He was an unsuccessful candidate for the United States Senate in 1916. He died in 1919.

BACON, ROGER, an English monk, and one of the most profound and original thinkers of his day, was born about 1214, near Ilchester, Somersetshire. He studied at Oxford and Paris. About 1250 he entered the order of Franciscans, but incurring the distrust of his ecclesiastical superiors was sent to Paris and there confined for 10 years without books or writing materials. He was thus punished because of extraordinary discoveries in science which ignorant minds attributed to magic. This opinion was countenanced by the jealousy and hatred of the monks of his fraternity. Having been set at liberty he enjoyed a brief space of quiet while Clement IV. was Pope; but in 1278 he was again thrown into prison, where he remained for at least 10 years. Of the close of his life little is known. His most important work is his "Opus Majus," where he discusses the relation of philosophy to religion, and then treats of language, metaphysics, optics, and experimental science. He was undoubtedly the earliest philosophical experimentalist in Britain; he made signal advances in optics; was an excellent chemist, and intimately acquainted with geography and astronomy, as appears by his discovery of the errors of the calendar and their causes. He died in Oxford, in 1294.

BACONIAN PHILOSOPHY, the inductive philosophy of which it is sometimes said that Lord Bacon was the founder. This, however, is an exaggerated statement. What Lord Bacon did for this mode of ratiocination was to elucidate and systematize it and point out its great value. The modern triumphs of modern science have arisen from a resolute adherence on the part of its votaries to the Baconian method of inquiry.

BACON'S REBELLION, a popular uprising of the Virginian colonists, headed by Nathaniel Bacon, in protest against certain government abuses, which prevailed under the administration of Sir William Berkeley. Parliament had passed an act requiring that all goods, destined for Virginia, no matter what their source, should first be sent to the mother-country for transfer into British ships. The inter-colonial duties were also objectionable, and when, in 1673, the entire revenues of the colony were turned over to Lords Culpeper and Arlington, indignation was rife. But the most pressing cause of complaint was the lack of official protection against Indian ravages. Bacon was a prominent member of the Council, and the colonists, determined to take Indian matters into their own hands, chose him leader. Berkeley proclaimed him a rebel. He attacked and captured the red-men's fort. Made a prisoner he was quickly released. He attacked Jamestown, forcing the Governor to repeal the most obnoxious statutes, exacting a major-general's commission for himself, and acquittal of all blame for the rebellion. Troops were sent for post-haste, but they refused to take up arms against Bacon. The rebel, on repairing to Jamestown, found the Governor fled. The Indians recommenced their aggressions. He knew that if he turned his attention to the latter, Berkeley would take Jamestown; nevertheless, he decided to dispose of the savages first. This he did effectively at Bloody Run. He then marched rapidly to Jamestown, besieged it, forced the Governor to take refuge on a warship, and burned all the public buildings. After partially revising the laws with great benefit to the people, he died, and the rebellion, left leaderless, came to an end.

BACTERIA, organisms that comprise a class of low plants, the importance of which is due to their power of producing profound changes in life. The terms bacteria, germs, microbes, bacilli, are popularly used to denote these microscopic objects. Bacillus means a little rod. The term is properly applicable to only such microbes as are rod-shaped. The word microbe (from the Greek, *mikros*, small, and *bios*, life) is a term which was coined to include all of the microscopic plants commonly included under the terms bacteria and yeasts.

Plants or Animals.—Bacteria possess characteristics of plants and animals. They resemble animals in their common power, independent motion, and in their habit of living upon complex bodies for food. But in general form, methods of growth, and formation of threads and spores they resemble plants. Though there are hundreds of different species there are only three general forms—spheres, rods, and spirals, reminding of billiard balls, pencils, and corkscrews. There is some, though slight, variation in size. All are extermely minute and never visible to the naked eye. They

range in size from 1-100000th to 1-3000th of an inch. Some species have the power of active motion, and may be seen moving rapidly to and fro in the liquid in which they are growing. This motion is produced by flagella, which protrude from the body.

Marvelous Multiplication.—They multiply by simple division or fission. Each individual elongates and then divides in the middle into similar halves; each of which then repeats the process. With some species the individuals remain attached after division, forming long chains; others produce solid groups of fours, eights, or sixteens. Some species that have been carefully watched under the microscope have been found, under favorable conditions, to grow so rapidly as to divide every half hour. At this rate in one day each microbe would produce over 16,000,000 descendants. At the end of the third day they would number millions of millions, the bulk and weight of which would be enormous, were it not that their rate of multiplication is checked either by lack of food or by the accumulation of their own excreted products, which are injurious to them.

Harmful Bacteria. — Bacteria abound in all putrescent or fermenting mixtures containing organic matter, and are the cause of fermentation and putrefaction. Some are present in, and the cause of, certain of the zymotic or ferment diseases, such as malignant pustule, erysipelas, tuberculosis, etc. Micrococci are spheroidal bacteria, and very small, never more than 1-25000th of an inch in diameter, often less. If they are kept out of surgical wounds, there is no suppuration. The discovery of this fact made hundreds of operations possible which of old were thought to be out of the reach of art—hence the wonderful success of antiseptic surgery.

Bacillus Tuberculosis. — Very great interest attaches to the bacillus tuberculosis, which is so constantly present that it is used as a means of differentiating the inflammatory diseases of the lungs from tuberculosis. This organism always produces the disease when inoculated into animals. Statistics have been published showing that the bacillus was present in 2,417 out of 2,509 cases of supposed tuberculosis.

Useful Bacteria.—In many respects bacteria are man's greatest benefactors; for upon their activities is founded the continued life of the animal and vegetable kingdoms. As microbes consume the material which serves them as food they produce chemical changes therein, resulting in simpler products called decomposition or cleavage products. Sometimes, however, they possess the power of building other compounds out of fragments, thus building up as well as tearing down. There are various industries based upon the decomposition powers of bacteria—viz., the maceration industries—in the separation of the valuable fibers from the useless fibrous material in the preparation of linen, jute, hemp, and cocoanut fiber; also in the commercial preparation of sponges, and often in the early stages of leather preparation. Some 50 years ago it was found that the mysterious substance known to brewers as yeast or barm was really composed of a vast number of minute oval particles that are endowed with the powers of growth and multiplication, and, therefore, undoubtedly living.

Bacteria in the Dairy.—In the majority of butter-making countries the cream is subjected to a process known as ripening or souring before it is churned; the cream is allowed to stand for from 12 to 17 hours, thus giving the bacteria an opportunity to grow in it. As a result the cream becomes somewhat soured, slightly curdled. Then the cream is churned. Not only does the ripened cream churn more rapidly and give a larger yield of butter than the sweet cream, but there are developed the peculiar flavor and aroma which are characteristic of the highest product. The dairymen in the great butter producing countries of northern Europe are making practical use of this knowledge and are utilizing pure cultures of certain bacteria which have been found to be advantageous for the purpose of cream ripening and the production of agreeable flavors.

Nitrifying Bacteria.—Everywhere in fertile soil is a class of bacteria which has received the name of nitrifying bacteria. They feed on the soil ingredients and have the same effect on the simple nitrogen cleavage products the vinegar-producing species have on alcohol—viz., bringing about a union with oxygen. Thus these nitrifying organisms form the last link in the chain that binds the animal kingdom to the vegetable kingdom. For the nitrates are left in the soil, and may now be seized upon by the roots of plants and begin once more the journey around the food cycle. In this way it will be seen that while plants, by building up compounds, form the connecting link between the soil and animal life, bacteria in the other half of the cycle, by reducing them again, give us the connecting link between animal life and the soil. The food cycle

would be as incomplete without the agency of bacterial life as it would be without the agency of plant life.

Aids to Digestion.—The attention of investigators has been directed in modern times to a hitherto unknown class of bacteria which have a share in the process of digestion in the stomach of man and the animals. It has long been known that the mouth, throat, intestines and other organs of the human system were inhabited by harmless bacteria. It was announced by Vignal that certain other microbes found habitually in the stomach possess properties similar to that of the saliva in aiding digestion. Numerous specimens were obtained and pure cultures made. With the artificially bred microbes a lot of experiments were tried. At least two kinds of organism were distinguished. One promoted the digestion of starch and another that of meat and albuminous substances. One acted most efficiently when it was slightly acidulated. The other needed to be a little alkaline. A third species seemed to have a special fitness for promoting the action of bile on fats.

BACTERIOLOGY, that branch of biology which treats of bacteria. The study of these microscopic organisms has developed into one of the most important branches of modern biological science.

BACTRIA (bac'trē-a), a province of the ancient Persian empire, lying N. of the Paropamisus (Hindu Kush) Mountains, on the upper Oxus. A northern branch of the same range separated it from the Sacæ, and it had Sogdiana on the N. and Ariana on the S. It thus corresponded pretty nearly with the modern Balkh. Here many scholars locate the original home of the Aryan or Indo-European family of nations. Its capital, Bactra, or Zariaspa, was also the cradle of the Zoroastrian religion. It maintained its independence until its subjugation by Cyrus about 540 B. C., when it became a satrapy of the Persian empire. It was included in the conquests of Alexander, and formed a part of the kingdom of the Seleucidæ until the foundation, about 256 B. C., by Diodotus, of the Greek kingdom of Bactria, which extended to the Indus, and which, after a long struggle, was overthrown by the Parthians.

BACTRITES (bak'trites, or bak-trī-tēs), a genus of fossil *ammonitidæ*, with a straight shell, and indented, but not ramified septa. The genus ranges from the lower silurian to the devonian.

BACULITES (bak-ū-lī'tēs), a genus of fossil ammonites, characteristic of the chalk, having a straight, tapering shell.

BACUP, a municipal borough of England, in Lancashire, 20 miles N. of Manchester. The chief manufacturing establishments are connected with cotton and woolen spinning and weaving; there are also iron works, Turkey-red dyeing works, and in the neighborhood numerous coal pits and immense stone quarries. Pop. about 22,500.

BADAGRI, or **BADAGRY**, a British seaport on the Bight of Benin, in the extreme S. W. corner of the southern Nigeria, Africa. Early in its history, it was a noted slave mart and contained important manufactories.

BADAJOZ (bä-dä-hōth'), the fortified capital of the Spanish province of Badajoz, on the left bank of the Guadiana, which is crossed by a stone bridge of 32 arches. It is the seat of the captain-general of Estremadura and of a bishop and has an interesting cathedral. During the Peninsular War, Badajoz was besieged by Marshal Soult, and taken in March, 1811. It was twice attacked by the English, on May 5 and 29, 1811; was besieged by Wellington on March 16, and taken April 6, 1812. Pop. (1917), province, 694,220; city, 37,600.

BADAKSHAN, a province of Afghanistan. It has the Oxus on the N. and the Hindu Kush on the S.; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. about 100,000.

BADEAU, ADAM (ba-dō'), an American military officer, born in New York City, Dec. 29, 1831; educated at private schools. He served with gallantry in the Union army during the Civil War; was on the staff of General Sherman in 1862-1863, and secretary to General Grant in 1864-1869; and in the latter year was retired with the rank of Captain in the regular army and of Brevet Brigadier-General of Volunteers, and was appointed Secretary of Legation in London. He was Consul-General in London, 1870-1881, but obtained leave to accompany General Grant in his world tour (1877-1878). In 1882-1884 he was Consul-General in Havana. His publications include "The Vagabond" (1859); "Military History of Ulysses S. Grant" (3 vols., 1867-1881); "Conspiracy; A Cuban Romance" (1885); "Aristocracy in England" (1886); and "Grant in Peace" (1886). He died March 19, 1895.

BADEN (bäd'en), one of the more important states of Germany, situated in the S. W. of Germany, to the W. of Württemberg. It is divided into four districts, Constance, Freiburg, Karlsruhe, and Mannheim; has an area of 5,823 square miles, and pop. about 2,200,000.

Topography.—It is mountainous, being traversed to a considerable extent by the lofty plateau of the Schwarzwald, or Black Forest, which attains its highest point in the Feldberg (4,904 feet). The whole of Baden, except a small portion in the S. E., in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the S. and W. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and include a considerable part of the Lake of Constance. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits, also. The manufactures are important. Among them are textiles, tobacco and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes and other musical toys. The capital is Karlsruhe, about 5 miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Pforzheim, Constanz, Baden-Baden, and Heidelberg. Baden-Baden has warm mineral springs, which were known and used in the time of the Romans. Heidelberg has a university (Protestant), founded in 1386. There are about 1,500 miles of railways, mostly owned by the state.

History.—In the time of the Roman Empire, southern Baden belonged to the Roman province of Rhætia. Under the old German empire it was a margravate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of Grand-Duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power was vested in the Grand-Duke, the legislative in a House of Legislature, consisting of an Upper and a Lower Chamber. In November, 1918, a resolution forced the abdication of the Grand-Duke Frederick II. who had succeeded to the throne in 1907. Baden was declared a republic Nov. 13, 1918, and in January, 1919, the National Assembly adopted a new constitution.

BADEN-BADEN, a town in the republic of Baden. Pop. about 25,000. It is chiefly celebrated for its medicinal springs, which were known in the time of the Romans. Its gaming tables, the most renowned in Europe, were closed with the rest of the licensed German gaming houses in 1872. The mineral springs consist of thermal saline waters. They contain chloride of sodium, with sulphate of lime, carbonate of iron, and carbonic acid, and a small quantity of lithia, and are used chiefly as hot baths.

BADEN-BEI-WIEN (bäd'en-bī-vēn'), a frequented watering place of Lower Austria, about 15 miles S. S. W. of Vienna. It was the Aquæ Pannoniæ, or Cethiæ of the Romans, and is still famous for its warm mineral springs. Near by is the former royal hunting lodge, Meierling, where Crown Prince Rudolf met a tragic end in 1889. Pop. about 20,000.

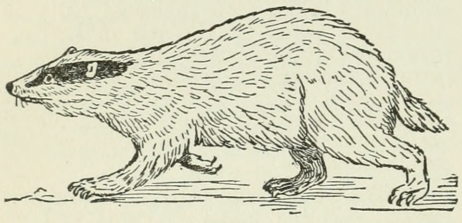
BADEN-POWELL, SIR ROBERT STEPHENSON SMYTH, a British military officer born in London, Feb. 22, 1857; was educated at the Charterhouse School; joined the 13th Hussars in 1876; was Adjutant in India, Afghanistan, and South Africa; Assistant Military Secretary on the staff in South Africa in 1887-1889; took part in the operations in Zululand in 1888; Assistant Military Secretary in Malta in 1890-1893; on special service in Ashanti, commanding the native levies, 1895, for which he was brevetted Lieutenant-Colonel, chief staff officer in the Matabeleland campaign, for which he was brevetted Colonel; and became Lieutenant-Colonel, commanding the 5th Dragoon Guards, in 1897. In the war in South Africa in 1899-1900, he signally distinguished himself by his grand defense of Mafeking, Cape Colony. (See BOER WAR). In recognition of his services the Queen appointed him a Major-General. He established the BOY SCOUTS (*q. v.*) in 1908, becoming a Lieutenant-General in the same year. General Baden-Powell has published several works, including "Reconnaissance and Scouting" (1890); "Vedette" (1890); "Cavalry Instruction" (1895); "The Downfall of Prempeh" (1896); "The Matabele Campaign" (1896); "Scouting for Boys" (1908); "My Adventures as a Spy" (1915); etc.

BADENWEILER (bäd'en-vī'ler), a watering place in the republic of Baden, near Mülheim. Its mineral springs are now rated among the indifferent waters,

and it is of interest chiefly for the ruins of Roman baths that were discovered in 1847. The foundation of the town is referred to the time of Hadrian, and the remains of the vapor baths, of which there are excellent specimens, are supposed to be of the same period.

BADGE, a distinctive device, emblem, mark, honorary decoration, or special cognizance, used originally to identify a knight or distinguish his followers.

BADGER, a plantigrade, carnivorous mammal, allied both to the bears and to the weasels, of a clumsy make, with short thick legs, and long claws on the fore-feet. The common badger (*meles vulgaris*) is as large as a middle-sized dog,



BADGER

but much lower on the legs, with a flatter and broader body, very thick, tough hide, and long, coarse hair. It inhabits the N. of Europe and Asia, burrows, is indolent and sleepy, feeds by night on vegetables, small quadrupeds, etc. Its flesh may be eaten, and its hair is used for artists' brushes in painting. The American badger belongs to a separate genus.

BADGER DOG, a long-bodied, short-legged dog, with rather large pendulous ears, usually short-haired, black, and with yellow extremities; often called by its German name, dachshund.

BADGHIS (bäd'gis), a region N. of Herat, Afghanistan, comprising the country between the Murghab and the Harirud rivers, as far N. as the edge of the desert. It lies just to the S. of the boundary line between Afghanistan and the Russian territories, as defined in 1887.

BADINGUET (bad-an-gā), the name of the person in whose garments Napoleon II. escaped from the fortress of Ham in 1846; afterward a nickname for Napoleon III.

BAD LANDS, tracts of land in the N. W. part of the United States. The absence of vegetation enables the rains to wash clean the old lake beds, and in many instances to disclose remarkable fossils of extinct animals. They were first called Bad Lands (*mauvaises terres*) by the French explorers in the region of the Black Hills in South Dakota.

BADMINTON, a popular game, closely resembling lawn tennis, played with battledore and shuttlecock on a rectangular portion of a lawn. The ground is divided crosswise by a strip of net, not less than three inches wide, suspended from poles at a height of five feet. As in lawn tennis, the ground on either side of the net is divided lengthwise into right and left courts. The first player, standing on a specified part of his right court, must strike the shuttlecock so as to fall across the net into the back section of the right court opposite. The opponent strikes it back, then it is returned by the first player, and so on till the first player misses the shuttlecock. After the first stroke, it suffices that the shuttlecock be sent across the net, if it does not fly beyond the boundaries.

BADRINATH (-at'), a peak of the main Himalaya range, in Garhwal district, Northwestern Provinces, India; 23,210 feet above the sea. On one of its shoulders, at an elevation of 10,400 feet, stands a celebrated temple of Vishnu, which some years attracts as many as 50,000 pilgrims.

BAEDEKER (bā'de-ker), **KARL**, a German publisher, born in 1801; originator of a celebrated series of guide-books for travelers. He died in 1859.

BAEKELAND, LEO HENDRIK, an American chemist, born in Ghent, Belgium, in 1863. He graduated from the University of Ghent and studied electrochemistry in Germany. After being a member of the faculty of several universities in Belgium, he came to the United States in 1889. He founded a company for the manufacture of photographic papers which he had invented, the best known of which was called Velox. From 1889 he was engaged in research mechanical work and was consulting chemist for many important industrial concerns. He invented bakelite, a chemical substance replacing hard rubber and amber. He was a member of the Naval Consulting Board from 1915 to 1920, and also was a member of many chemical societies, both in the United States and abroad. He took out many patents in the United States and abroad on subjects of organic chemistry, electric insulation, etc., and contributed much to chemical magazines on chemical subjects.

BAEYER, ADOLF VON (bā'yer), a German chemist, born in Berlin, Oct. 31, 1835; became Professor of Chemistry at

Strasburg in 1872, and at Munich, in 1875, succeeding Liebig at Munich. He made many important discoveries in organic chemistry, especially cerulein, eosin and indol, and discovered a process of making artificial indigo. In 1905 he was awarded the Nobel prize for chemistry. He died in 1917.

BAEZA (bä-ā'tha), a town, Spain, in Andalusia, 22 miles E. N. E. from Jaën. Pop. about 17,500. The principal edifices are the cathedral, the university (now suppressed), and the old monastery of St. Philip de Neri.

BAFFIN, WILLIAM, an English navigator and discoverer, believed to have been born in London about 1584; but the earliest known fact regarding him is that he sailed in 1612 as pilot of the "Patience" from Hull, on a voyage of discovery to Greenland. In 1613-1614 he served in the Spitzbergen whale fishery, and he wrote an account of this and his previous voyage. In 1615 he took service with a company as pilot of the "Discovery," in search of a northwest passage and made a careful examination of Hudson Strait. His recorded latitudes and notes of the tides are in remarkable agreement with those of a later date. In the following year, with Capt. Bylot, he discovered, charted, and named Smith Sound, and several others, and explored the large inlet now associated with his name. Later investigation has confirmed his descriptions. His last voyages, 1616-1621, were to the East. At the siege of Ormuz, which the English were helping the Shah of Persia to recover from the Portuguese, he was killed, Jan. 23, 1622. See "Voyages of William Baffin, 1612-1622," edited by C. R. Markham (1880).

BAFFIN LAND, a Canadian island, crossed by the Arctic Circle; area, about 236,000 square miles.

BAFFIN SEA (erroneously styled a Bay), a large expanse of water in North America, between Greenland and the lands or islands N. of Hudson Bay, extending from 68° to 78° N., and 55° to 80° W. It communicates with the Atlantic Ocean by Davis Strait on the S., with the Arctic Ocean by Lancaster Sound and Jones Sound on the W., and with the Polar Sea by Smith Sound and Robeson Channel on the N. Depth, 200-1,050 fathoms. The tides do not rise more than 10 feet. The surface of the sea is covered with ice during the greater part of the year. The coasts are mountainous, barren, and deeply indented with gulfs. Whale and seal fishing is followed. This sea was discovered by the English navigator, Baffin, in 1616.

BAGAMOYO (bag-a-moi'o), a town of former German East Africa, on the coast opposite the island of Zanzibar; pop. about 25,000. It is an important trading station for ivory, iron, copra, gum and caoutchouc. Bagamoyo is a point of departure for caravans into the interior. The chief imports are cottons, iron ware, rice, oil, spirits, and beer.

BAGASSE (bä-gäs'), the sugar cane in its dry, crushed state, as delivered from the mill, and after the main portion of its juice has been expressed; used as fuel in the sugar factory, and called also cane trash.

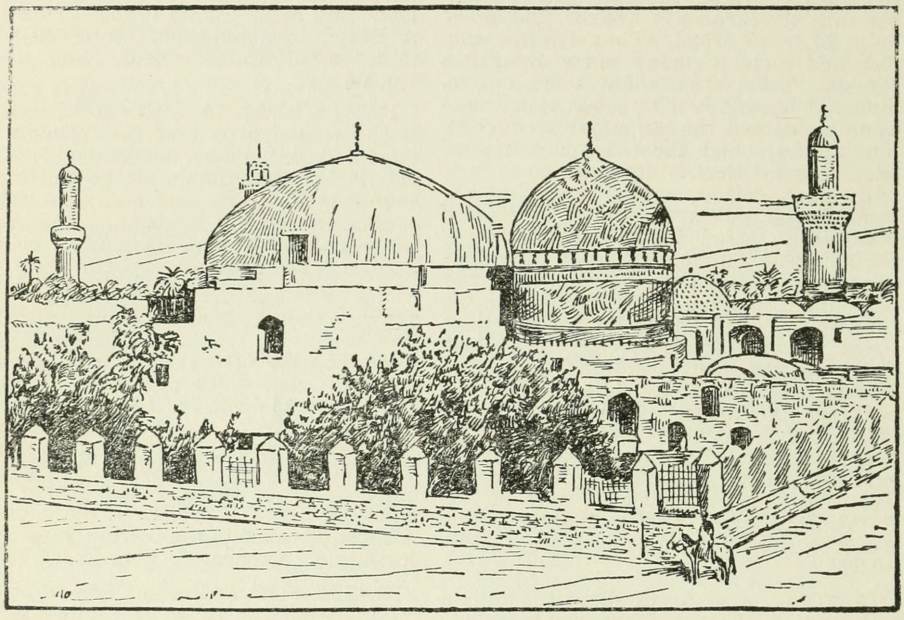
BAGATELLE, a game played on a long, flat board, covered with cloth like a billiard-table, with spherical balls and a cue, or mace. At the end of the board are nine cups, or sockets, of just sufficient size to receive the balls. These sockets are arranged in the form of a regular octagon. The chief aim of the players is to put the balls in the sockets which are numbered.

BAGAUDÆ (bag'ō-dī), a Gallic tribe which revolted under Carinus and was subdued by Maximian in 286 A. D.

BAGBY, GEORGE WILLIAM, an American physician and humorist, born in Buckingham co., Va., Aug. 13, 1828; wrote under the pseudonym "Mozis Addums." He was editor of the Lynchburg "Express" (1853), and "Southern Literary Messenger" (1859); State Librarian of Virginia (1870-1878), and contributor to various magazines. He wrote "John M. Daniel's Latch-Key" (1868); "What I Did With My Fifty Millions" (1875); and "Meekins' Twinses" (1877). He died in Richmond, Va., Nov. 29, 1883.

BAGDAD (bag-dad'), or **BAGHDAD,** capital of the former Turkish *vilayet* of the same name, in the southern part of Mesopotamia (Irak Arabi). The greater part of it lies on the eastern bank of the Tigris, old Bagdad, the residence of the caliphs (now in ruins), was on the western bank of the river. The modern city is surrounded with a brick wall about 6 miles in circuit; the houses are mostly built of brick, the streets unpaved, and very narrow. The palace of the Governor is spacious. Manufactures: leather, silks, cottons, woolens, carpets, etc. Steamers ply on the river between Bagdad and Bassorah, and the city exports wheat, dates, galls, gum, mohair, carpets, etc., to Europe. Bagdad is inhabited by Turks, Arabs, Persians, Armenians, Jews, etc., and a small number of Europeans. The Turks compose three-fourths of the

whole population. The city has been frequently visited by the plague, and, in 1831, was nearly devastated by that calamity. Bagdad was founded in 762, by the Caliph Almansur, and raised to a high degree of splendor, in the 9th century, by Haroun Al Raschid. It is the scene of a number of the tales of the "Arabian Nights." In the 13th century it was stormed by Hulaku, grandson of Genghis-Khan, who caused the reigning caliph to be slain, and destroyed the caliphate. In the World War (1914-1918) British forces captured the city, March 11, 1917, and it has since been governed by a British commission. As a result of the peace treaty, handed to the Turkish peace delegates in Paris on May 11, 1920, Bagdad became part of the independent state of Mesopotamia. Pop. of vilayet about 900,000. City, about 225,000.



MOSQUE OF ABDUL KADR AT BAGDAD

BAGDAD RAILWAY. See MESOPOTAMIA.

BAGEHOT, WALTER (bāj'ot), an English writer on political economy and government, born in Langport, Somersetshire, Feb. 3, 1826; was graduated at University College, London, and admitted to the bar; but never entered practice. His principal works are "The English Constitution"; "Physics and Politics"; and "Lombard Street: a Description of the Money Market." He died in London, March 24, 1877.

BAHAMA BANK, GREAT and **LITTLE**, shoals among the West India Islands; the former between 22° and 26° N., 75° and 79° W., having S. and W. the Bahama old and new channels. On it are the islands of Providence, Andros, and Exuma. The Little Bank, N. W. of the foregoing, between 26° and 27° N., 77° and 79° W., has on it the Great Bahama and Abaco Islands.

BAHAMA CHANNEL, OLD and **NEW**, two American channels; the former separates the Great Bahama Bank and Cuba; the latter, also called the Gulf of Florida, is between the Great and Little Bahama Banks and Florida, and forms a part of the channel of the great Gulf Stream, which flows here at the rate of from 2 to 5 miles an hour.

BAHAMA ISLANDS, or LUCAYOS, a group of islands in the West Indies, forming a colony belonging to Great Britain, lying N. E. of Cuba and S. E. of the coast of Florida, the Gulf Stream passing between them and the mainland. They extend a distance of upward of 600 miles, and besides innumerable keys and rocks, number 20 inhabited islands. The principal islands are Grand Bahama,

Great and Little Abaco, Andros Islands, New Province, Eleuthera, San Salvador, Great Exuma, Watling Island, Long Island, Crooked Island, Acklin Island, Mariguana Island, Great Inagua. Of the whole group the most populous is New Providence, which contains the capital, Nassau; the largest is Andros, 100 miles long, 20 to 40 broad. They are low and flat, and have in many parts extensive forests. Total area, about 4,500 square miles. The soil is a thin but rich vegetable mold, and the principal product is pine apples, which form the most important export. Other fruits are also grown, with sisal, cotton, sugar, maize, yams, groundnuts, cocoanuts, etc. Sponges are obtained in large quantity and are exported. San Salvador, or Cat Island, is generally believed to be the same as Guanahani, the land first touched on by Columbus (Oct. 12, 1492) on his first great voyage of discovery. The first British settlement was made on New Providence toward the close of the 17th century. A number of loyal Americans settled in the islands after the War of Independence. The government is administered by a British governor, by executive and legislative councils of 9 members each, and a representative assembly of 29 members. Pop. (1918) 59,928.

BAHIA, a state of Brazil. It has an area of about 165,000 square miles. The coast is well wooded and is fertile. The land in the interior is high and is not well adapted for agriculture. The northern part is composed chiefly of desert land. The chief river is Sao Francisco, which crosses the state from south to north. The climate on the coast is hot and moist, while the interior is dry. The chief products are tobacco, sugar, cotton, fruits, coffee, and cocoa. Rubber trees have also been introduced. Mines of gold and diamonds exist and salt and saltpeter are found. Commerce is chiefly with Great Britain and France. The chief exports are tobacco, sugar, rubber, coffee, and skins. An important railway line is owned by the state. Pop. about 2,500,000. The capital is Bahia.

BAHIA, the capital of the state of the same name in Brazil. It is on the east shore of the Bay of All Saints and is about 800 miles N. E. of Rio Janeiro with which it is connected by steamship and cable. The new city is well built, while the old has narrow and dirty streets. The new city is much higher in elevation than the old and they are connected by hydraulic elevators. The city is the seat of an archbishop. It has several handsome churches, notably the cathedral, and a fine archbishop's palace. There is a university, a normal school, a public library, and a museum. There are electric railways and an excellent harbor, which has been recently improved. The chief industries are the manufacture of cotton cloth, shoes, boots, and hats. Bahia is the second city of Brazil in population. It is the seat of a United States consul. Pop. about 300,000.

BAHIA BLANCA, a city of Argentina, in the southern part of the province of Buenos Aires, about 450 miles S. W. of the city of that name. It is well built, having good streets and many handsome public buildings. It is an important railway center and has an excellent harbor. The leading exports are wool and grain. The city is the principal naval base of Argentina. Pop. about 75,000.

BAHIA HONDA (bä-ē'a on'dä), a seaport of Cuba, in the province of Pinar del Rio, on the coast of the Gulf of Mexico, and lying on a small bay, bearing the same name. The town and bay are about 50 miles W. of Havana, being commanded by a small fort. There are mines of coal and copper in the vicinity. A short distance to the S. are the sulphur springs of Aguacate. Pop. about 1,500.

BAIÆ (bī'ē), an ancient Roman watering-place on the coast of Campania, 10 miles W. of Naples. Many of the wealthy Romans had country houses at Baiæ, which Horace preferred to all other places. Ruins of temples, baths, and villas still attract the attention of archæologists.

BAIKIE, WILLIAM BALFOUR, an English explorer, born in the Orkney Islands, Aug. 27, 1825; joined the British navy, and was made Surgeon and Naturalist of the Niger Expedition, 1854. He took the command on the death of the senior officer, and explored the Niger for 250 miles. Another expedition, which started in 1857, passed two years in exploring, when the vessel was wrecked, and all the members, with the exception of Baikie, returned to England. With none but native assistants he formed a settlement at the confluence of the Benué and the Quorra, in which he was ruler, teacher, and physician, and within a few years he opened the Niger to navigation, made roads, established a market, etc. He died in Sierra Leone, Dec. 12, 1864.

BAILEY, JOSEPH WELDON, an American public official, born in Copiah co., Miss., in 1863. He received a common school education, and after study-

ing law was admitted to the bar in 1883. In 1885 he removed to Gainesville, Tex. He entered politics and was a member of the 52d and 56th Congresses, taking a prominent part in the deliberations of the House of Representatives and quickly becoming one of the most conspicuous members. He was elected Senator in 1907. In 1911, before the expiration of his term, he resigned. Though later withdrawing his resignation, he refused to stand for re-election. In the Senate he was one of the leaders of the Democratic party. He was a candidate for Governor of Texas in 1920, but was defeated.

BAILEY, LIBERTY HYDE, an American horticulturist, born in South Haven, Mich., March 15, 1858; graduated at the Michigan Agricultural College in 1882; was associate to Dr. Asa Gray at Harvard University in 1882-1883; Professor of Horticulture and Landscape Gardening in the Michigan Agricultural College in 1883-1888; and in the last year became Professor of Horticulture in Cornell University. In 1903 he became Dean of the College of Agriculture and director of the experimental station, retiring in 1913. He was an associate editor of the revised edition of "Johnson's Universal Cyclopædia" (1892-1896), and editor of "American Gardening." He published a large number of technical works, including "Annals of Horticulture," "Evolution of Our Native Fruits," "Principles of Fruit Growing," "Text-book of Agriculture," "Cyclopedia of American Horticulture" (1900 - 1902); "Cyclopedia American Agriculture" (1907-1909).

BAILEY, WILLIAM WHITMAN, an American botanist, born in West Point, N. Y., Feb. 22, 1843. He was educated at Brown and Harvard, having been a pupil of Prof. Asa Gray. In 1867 he was botanist of the United States Geological Survey of the 40th parallel; in 1867-1869 assistant librarian of the Providence Athanæum. He was appointed Instructor in Botany at Brown University in 1877, and became professor there in 1881. He published "Botanical Collectors' Handbook" (1881); "Botanizing" (1899); "Poems" (1910). Died Feb. 20, 1914.

BAILLIE, JOANNA, a Scottish author, born at Bothwell, Lanarkshire, Sept. 11, 1762; removed in early life to London. Here in 1798 she published her first work, entitled "A Series of Plays," in which she attempted to delineate the stronger passions by making each passion the subject of a play. The series was followed up by a second volume in 1802, and a third in 1812. A second series appeared in 1836, and a complete edition of her whole dramatic works in 1850. She also published a volume of miscellaneous poetry, in 1841. Her only plays performed on the stage were a tragedy, the "Family Legend," and "De Montfort." She died in Hempstead, Feb. 23, 1851.

BAIREUTH. See BAYREUTH.

BAIZE, a sort of coarse woolen fabric with a rough nap, now generally used for linings, and mostly green or red in color.

BAJA (bä'yä), an Italian seaport town, W. of Naples. It is the ancient Balae.

BAJA, a market town of Hungary, near the Danube, 90 miles S. of Pest. It is celebrated for its annual swine fair, and its trade in grain and wine. Pop. about 22,500.

BAJAZET (bī-ä-zēd'), or **BAYAZEED, I.**, an Ottoman Sultan, born 1347, succeeded his father, Amurath I., in 1389. He was the first of his family who assumed the title of Sultan. The Turkish Empire at this time extended W. from the Euphrates to the shores of Europe, and Amurath had crossed the Bosphorus, subdued the greater part of Thrace, and fixed the seat of his power at Adrianople. Bajazet wrested the N. parts of Asia Minor from the dominion of various Turkish emirs whose power had long been established there. In Europe he conquered Macedonia and Thessaly, and invaded Moldavia and Hungary. Sigismund, King of the latter country, met him at the head of 100,000 men, including the flower of the chivalry of France and Germany, but was totally defeated at Nicopoli, on the Danube, Sept. 28, 1396. Bajazet was preparing for an attack on Constantinople, when he was interrupted by the approach of Timur the Great, by whom he was defeated at Angora, in Anatolia, July 28, 1402. He was taken captive, and died about nine months afterward, at Antioch in Pisidia. He was succeeded by Mohammed I.

BAJAZET II., a Sultan of the Turks; he succeeded his father, Mohammed II., in 1481. His brother, Zizim, unsuccessfully contested the empire with him, assisted by Caith Bey, Sultan of the Egyptian Mamelukes. Bajazet undertook an expedition against Caith Bey, but was defeated, with great loss, near Mount Taurus in Cilicia, in 1489. He was more fortunate in Europe, where, in the same year, his generals conquered Croatia and Bosnia. Bajazet was engaged in long and bloody hostilities with the Molda-

vians, the Rhodians, and especially the Venetians, who frequently invaded the S. of Greece; and with Ishmael, King of Persia. At home he had to contend against his rebellious son, Selim, to whom at last he resigned the empire. He died in 1512.

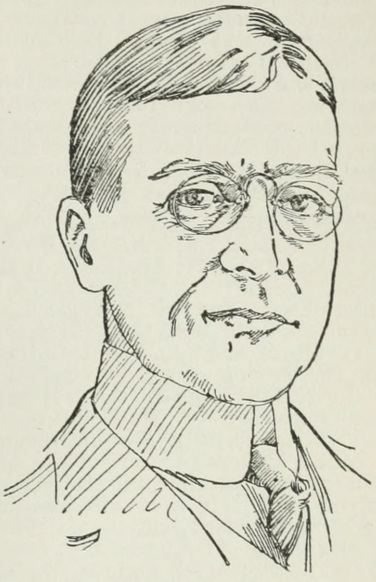
BAKEL, a town with a strong fort, in the E. of the French colony of Senegal, on the left bank of the Senegal river. Pop. about 2,000.

BAKER, a city of Oregon, the county-seat of Baker co., on the Powder river and on the line of the Oregon Railroad and Navigation Company. It is the center of an important mining region and has also an extensive trade in lumber, wool, live stock, and mineral products. The surrounding country produces agricultural products in large quantities. There is an opera house, a Masonic temple, a hospital, and other public buildings. Pop. (1910) 6,742; (1920) 7,729.

BAKER, SIR BENJAMIN, an English engineer, born near Bath, in 1840. In 1877 he superintended the removal of Cleopatra's Needle from Egypt to London. In conjunction with Sir John Fowler he drew the plans for the great bridge over the Firth of Forth. He also did important work in connection with the Assouan dam, the Blackwall tunnel, the Tower Bridge (London) and the (London) Metropolitan Railway System. He has written numerous scientific treatises, including "Long Span Iron Bridges," "Suspension Versus Cantiliver Bridges," "The Strength of Beams," and "Transportation and Re-erection of Cleopatra's Needle." He died in 1917.

BAKER, MOSES NELSON, an American civil engineer, born in Enosburg, Vt., Jan. 26, 1864; was graduated at the University of Vermont in 1886; was editor for several years of the "Manual of American Waterworks," and associate editor and later editor of "Engineering News." He wrote "Sewage Purification in America," "Sewerage and Sewage Purification," etc., contributed to the Standard Dictionary, and is the author of various works on engineering, sanitation, etc.

BAKER, NEWTON DIEHL, an American public official, born in Martinsburg, W. Va., in 1871. He graduated from Johns Hopkins University in 1892, studied law at Washington and Lee University, and practiced law in Martinsburg, W. Va., in 1897. From 1902 to 1912 he was city solicitor of Cleveland, O., and was mayor from 1912 to 1914. His introduction of several radical methods in the administration of the city government attracted wide attention. On March 7, 1916, he was appointed Secretary of War to succeed Lindley M.



NEWTON DIEHL BAKER

Garrison, who had resigned. He was Secretary of War during the administration of President Wilson, and his administration of the War Department during the World War was widely criticized. He was, however, supported by President Wilson, who resisted all demands for his removal. The criticisms made against Mr. Baker were not directed toward his integrity or good intentions, but rather to a lack of administrative ability. During his term of office he made several tours for the inspection of the American Expeditionary Forces in France. He wrote "Frontiers of Freedom—A Collection of Addresses" (1917).

BAKER, RAY STANNARD, an American author, born in Lansing, Mich., in 1870. After graduating from the Michigan Agricultural College in 1889, and carrying on special studies in law and literature at the University of Michigan, he engaged in newspaper work and was for several years assistant editor of "McClure's Magazine," from 1906 to 1915, and was one of the editors of the "American Magazine." He wrote a series of articles on the corruption of the government in American cities and did much to bring about improved conditions in municipal government. His published writings include "Following the

Color Line" (1908); "New Ideals in Healing" (1909); "The Spiritual Unrest" (1910). Under the pen name of David Grayson he wrote "Adventures in Contentment" (1907); "Adventures in Friendship" (1910); "Great Possessions" (1917).

BAKER, SIR SAMUEL WHITE, an English traveler, born in 1821. He resided some years in Ceylon, and, in 1861, began his African travels, which lasted several years, in the upper Nile regions, and resulted, among other discoveries, in that of Albert Nyanza Lake in 1864, and of the exit of the White Nile from it. Upon his return to England he was knighted. In 1869 he returned to Africa as head of an expedition sent by the Khedive of Egypt to annex and open up to trade a large part of the newly explored country, being raised to the dignity of Pasha. He returned in 1873, having finished his work. His writings include "Eight Years' Wanderings in Ceylon," "The Albert Nyanza, etc.," "The Nile Tributaries of Abyssinia," "Ismailia: a Narrative of the Expedition to Central Africa," "Cyprus as I saw it in 1879," "Cast Up by the Sea" (1869). He died Dec. 30, 1893.

BAKER, MOUNT, an occasionally active volcano in Whatcom co., Wash., belonging to the Cascade Range; very active in 1880; elevation, 10,827 feet.

BAKERSFIELD, a city of California, the county-seat of Kern co. It is on the Southern Pacific and the Atchison, Topeka and Santa Fé railroad and on the Kern river. There are several handsome public buildings, including a public library. The city is the center of a natural gas, agricultural, and fruit-growing region. It contains foundries and machine shops. There are important gold mines in the vicinity. There are also deposits of fullers' earth, gypsum, marble, salt, copper, borax, iron, and sulphur. Pop. (1910) 12,727; (1920) 18,638.

BAKST, LEON NIKOLAJEWITSCH, a Russian artist, born in Petrograd in 1886. He studied art in Petrograd and Paris, and began his career as an artist in Moscow, where his treatment of political subjects in his paintings so displeased the Russian authorities that he removed to Paris in 1906. There he took up stage direction and his work as an original designer of stage settings created an immediate impression. He designed settings for several well-known plays and operas, including "Salome," "The Butterflies," and "The Orientale." He designed stage settings and decorations for many plays and operas given in New York and several exhibitions of his designs and drawings were held in that and other American cities.

BAKU (bä-kö'), a Russian port on the W. shore of the Caspian, occupying part of the peninsula of Apsheron. The naphtha or petroleum springs of Baku have long been known; and the Field of Fire, so called from emitting inflammable gases, have long been a place of pilgrimage with the Guebers or fire-worshippers. In modern times, from the development of the petroleum industry, Baku has greatly increased, and has become a large and flourishing town. Hundreds of oil wells are in operation, producing immense quantities of petroleum, much of which is led direct in pipes from the wells to the refineries in Baku. Baku, previous to the World War, was the station of the Caspian fleet, was strongly fortified, and had a large shipping trade. In 1901 and 1905 conflicts between the Armenians and Tartars resulted in the partial demolition of the town and costly conflagrations in the oil field. During the World War (1914-1918) Baku was the scene of severe fighting. In May, 1918, Baku became the capital of the new republic of Azerbaïjan. The liberal government formed at that time was overthrown by the Bolsheviki in April, 1920, and Baku again was the scene of much fighting.

BAKUNIN, MICHAEL (bä-kö'nin), a Russian anarchist, the founder of Nihilism, born in 1814 of rich and noble family, entered the army, but threw up his commission after two years' service, and studied philosophy at Moscow. Having adopted Hegel's system as the basis of a new revolution, he went in 1841 to Berlin, and thence to Dresden, Geneva, and Paris, as the propagandist of anarchism. He was handed over to Russia, in 1851, by Austria, imprisoned for five years, and finally sent to Siberia. Escaping thence through Japan, he joined Herzen in London, on the staff of the "Kolokol." His extreme views, however, ruined the paper and led to a quarrel with Marx and the International. He died suddenly and almost alone at Berne, in 1878. He demanded the entire abolition of the state as a state, the absolute equalization of individuals, and the extirpation of hereditary rights and of religion.

BALAKLAVA, a small seaport in the Crimea, 8 miles S. S. E. of Sebastopol, consisting for the most part of houses perched upon heights. In the Crimean War it was captured by the British, and a heroically fought battle took place here

(Oct. 25, 1854), ending in the repulse of the Russians by the British. The charge of the Light Brigade was part of this battle.

BALANCE, an instrument for determining the relative weights or masses of bodies. It consists of a beam with its fulcrum in the middle, and its arms precisely equal. From the extremities of the arms are suspended two scales, the one to receive the object to be weighed, and the other the counterpoise.

A false balance of this type is one in which the arms are unequal in length. As the balance is really a lever, it is evident that a smaller weight than that in the scale will put the beam into equilibrium. The fraud may at once be detected by putting the article to be weighed into the scale containing the weight, and *vice versa*.

Hydrostatic balance: A balance designed for the weighing of bodies in water, with the view of ascertaining their specific gravity.

A Roman balance, the same as the steel-yard. Of this type the Chinese, the Danish or Swedish, and the bent lever balances are modifications.

In mechanics and natural philosophy:

Balance of torsion: An instrument invented by Coulomb for comparing the intensities of very small forces. It consists of a metallic wire suspended vertically from a fixed point, to the lower end of which a horizontal needle is attached with a small weight designed to keep the wire stretched. The magnitude of a small force acting on the end of the needle is measured by the amount of torsion, or twisting of the wire—in other words, by the arc which the needle passes over measured from the point of repose.

In horology:

1. Balance of a watch: The circular hoop or ring which takes the place of the bob of a pendulum in a clock. The action of a hair-spring causes it to vibrate.

2. Compensating balance of a chronometer: A balance, or wheel, furnished with a spiral spring, with metals of different expansibility so adjusted that, in alterations of temperature, they work against each other and render the movements of the chronometer uniform.

In astronomy: A constellation, one of the signs of the zodiac, generally designated by its Latin name, *Libra*.

In book and account keeping: The excess on the debtor or creditor side of an account, which requires to be met by an identical sum entered under some heading on the other side if an equilibrium is to be established between the two.

In commercial and political economy: **Balance of trade**, properly an equilibrium between the value of the exports from, and the imports into, any country, but more commonly the amount required on one side or other to constitute such an equilibrium.

In politics: Balance of power, such a condition of things that the power of any one state, however great, is balanced by that of the rest.

BALBEC. See BAALBEK.

BALBOA, VASCO NUÑEZ DE, a Spanish explorer, born at Xeres de los Caballeros, in 1475. He accompanied Rodrigo de Bastidas in his expedition to the New World, and first settled in Haiti (or, as it was then termed, Hispaniola). Though an adventurer in search of fortune, his great ambition seems to have been to discover another great ocean. He proceeded to the American continent, and there founded a colony. Accompanied by a small band of followers, he began to thread the almost impenetrable forests of the Isthmus of Darien. At length, after a toilsome and dangerous journey, Balboa and his companions approached, on Sept. 25, 1513, the summit of the mountain range, when Balboa, leaving his followers and advancing alone to the W. declivity, was the first to behold the vast unknown ocean, which he named the Pacific. Surrounded by his followers, he walked into it, carrying in his right hand a naked sword, and in his left the banner of Castile, and declared the sea of the South, and all the regions whose shores it bathed, to belong to the crown of Castile and Leon. During his absence, however, a new governor had been appointed to supersede Balboa in Haiti; where, on his return, jealousy and dissensions springing up between them, Balboa, accused of a design to rebel, was beheaded in 1517.

BALBRIGGAN, a watering place in County Dublin, Ireland, 21 miles N. by E. of Dublin. It is a seat of linen, cotton, calico, and stocking manufactures. Many women are employed in embroidering muslin. The term "Balbriggan" is now used to describe certain varieties of cotton-knit goods.

BALCH, EMILY GREENE, an American economist, born in Jamaica Plain, Mass., in 1867. She was graduated from Bryn Mawr College in 1889, studied economics in Paris and Berlin, and afterward carried on settlement work in the Denison House in Boston in 1892-1893. She was assistant in economics at Wellesley College in 1896-1897, instructor from 1897 to 1903, associate professor from 1903 to 1913, and professor of political economy and social science from

1913. She was a member of many state commissions on industrial problems and immigration, a member of the City Planning Board of Boston from 1914, and a delegate to the International Congress of Women at The Hague and to several other international congresses. She wrote "Public Assistance of the Poor in France" (1893); "Women at The Hague" (1915); "Approaches to the Great Settlement" (1918); etc.

BALDER, or **BALDUR**, a Scandinavian divinity, represented as the son of Odin and Frigga, beautiful, wise, amiable, and beloved by all the gods. His mother took an oath from every creature, and even from every inanimate object, that they would not harm Balder, but omitted the mistletoe. Balder was, therefore, deemed invulnerable, and the other gods in sport flung stones and shot arrows at him without harming him. But the evil god, Loki, fashioned an arrow from the mistletoe and got Balder's blind brother Höder to shoot it, himself guiding his aim. Balder fell dead, pierced to the heart, to the deep grief of all the gods. He is believed to be a personification of the brightness and beneficence of the sun.

BALD MOUNTAIN, the name of several eminences in the United States, of which the following are the principal: (1) In Colorado, height, 11,493 feet; (2) in California, height, 8,295 feet; (3) in Utah, height, 11,975 feet; (4) in Wyoming, in the Wind River Range, height, 10,760 feet; and, (5) in North Carolina, height, 5,550 feet.

BALDNESS, an absence of hair on the head. Congenital baldness (complete absence of hair at birth) is sometimes met with; but, in most cases, is only temporary, and gives place, in a few years, to a natural growth of hair. Occasionally, however, it persists through life. Senile baldness (calvities) is one of the most familiar signs of old age. It commences in a small area at the crown, where the natural hair is first replaced by down before the skin becomes smooth and shining. From this area the process extends in all directions. It is more common in men than women.

Baldness in patches (*alopecia areata*) attacks chiefly children and young persons, frequently those of debilitated constitutions. The only change at first perceptible is that the hair falls out in one or more places, leaving smooth bare patches. *Alopecia areata* has been attributed to the action of a parasite; but it is more probably due to some obscure nervous influence.

BALDWIN, BALDOUIN, or **BALDUIN**, the name of a long line of sovereign Counts of Flanders, of whom the most celebrated was Baldwin IX., who became, afterward, Emperor of Constantinople.

BALDWIN I., the son of Baldwin VIII., Count of Flanders and Hainault, born in Valenciennes in 1170. In 1200, he joined the crusaders with his brother Thierry, and, in 1202, aided the Venetians in their attack upon Constantinople, of which city he was crowned Emperor, May 16, 1204. In the next year Baldwin was taken prisoner by the King of Bulgaria, and, it is said, died in captivity in 1206. He was much esteemed by the Greeks for his charity, temperance, and justice.

BALDWIN II., the last Frank Emperor of Constantinople, born in 1217. He was the son of Pierre de Courtenay, and succeeded his brother Robert in 1228. He was twice besieged in his imperial city, and being too weak to defend his dominions, repaired to Italy to seek aid from the Pope. At the court of France, Baldwin was favorably received by the king, St. Louis, to whom he presented a crown of thorns, which was held by all Christendom to be the genuine relic. Baldwin, in 1239, set out for Constantinople with a body of crusaders, who, however, soon quitted him, and took the route to Palestine. He succeeded, ultimately, in raising new forces in the West, and regained his capital; but, in 1261, Michael Paleologus invested it, and entered Constantinople on the 29th of July. Baldwin fled to Sicily, where he died in obscurity, in 1273.

BALDWIN I., King of Jerusalem, was the son of Eustace, Count of Bouillon, and accompanied his brother Godfrey of Bouillon into Palestine, where he gained the sovereignty of the state of Edessa. He succeeded his brother on the throne of Jerusalem in 1100, and for 18 years waged war against the Turks, the Arabs, the Persians, and the Saracens. He secured for the Christians the coast of Syria, from the Gulf of Issus to the confines of Egypt. He died at Laris, in the desert, in 1118, and was buried on Mount Calvary.

BALDWIN II., King of Jerusalem, son of Hugh, Count of Rethel, was crowned in 1118, after Eustace, brother of Baldwin I., had renounced all claim to the vacant throne. In 1120 he gained a great victory over the Saracens, but, in 1124, he was taken prisoner by them, and was ransomed only by giving up Tyre. In 1131 he abdicated in favor of

his son-in-law, Foulques of Anjou, and retired to a monastery, where he died. The Order of Templars, for the defense of the Holy Land, was instituted in his reign.

BALDWIN III., King of Jerusalem, son of Foulques of Anjou, whom he succeeded in 1142, under the guardianship of his mother. He took Ascalon and other places; but under his reign the Christians lost Edessa. Born in 1130; died at Antioch, in 1162. He was succeeded by his brother, Amaury I.

BALDWIN IV., son of Amaury, succeeded to the throne of Jerusalem on the death of his father, in 1174; but being leprous, Raymond, Count of Tripoli, governed the kingdom for him. He afterward resigned the throne to his nephew, Baldwin V., in 1183, and died in 1185.

BALDWIN V., King of Jerusalem, son of Sibylla, sister of Baldwin IV., was called to the throne when five years old, in 1183, and died of poison, supposed to have been administered by his mother, in order that her second husband, Guy de Lusignan, might enjoy the throne. The following year, 1187, the Christians lost Jerusalem, which was taken by Saladin.

BALDWIN, EVELYN BRIGGS, an American explorer, born in Springfield, Mo., in 1862. He graduated from Northwestern College in 1885, and from 1887 to 1891 was principal of a high school, and superintendent of city schools in Kansas from 1892 to 1900. From 1892 to 1900 he acted as observer of United States Weather Bureau and inspector-at-large of the signal corps of the United States. He accompanied Peary on his North Greenland expedition in 1893-1894, and was meteorologist and second in command in Walter Wellman's expedition to Franz-Josef Land in 1898-1899. In the latter year he discovered and explored Graham Bell Land, organized and commanded the Baldwin-Ziegler polar expedition in 1901-1902, and later carried on other explorations on the northeast coast of Greenland. He was the author of "Search for the North Pole"; "Franz-Josef Land" (1898); "North Greenland Expedition" (1894); etc.

BALDWIN, JAMES MARK, an American psychologist, born in Columbia, S. C., Jan. 12, 1861; educated at Princeton College, Leipsic, Berlin, and Tübingen Universities; was, successively, Instructor of German and French at Princeton in 1886-1887; Professor of Philosophy in Lake Forest University in 1887-1889, and in the University of Toronto in 1889-1893; Professor of Psychology at Princeton University, 1893-1903; Professor of Philosophy and Psychology at Johns Hopkins University 1903-1909; Professor at the National University of Mexico, 1909. He was Vice-President of the International Congress of Psychology at London in 1892; Honorary President of the International Congress of Criminal Anthropology at Geneva in 1896; President of the American Psychological Association in 1897-1898; Judge of Award at the World's Columbian Exposition in 1893; was awarded a gold medal by the Royal Academy of Arts and Sciences of Denmark, in 1897, for the best work in ethics; was elected a member of the Institut International de Sociologie, in 1898, and President of International Congress of Psychology at Geneva in 1909; and was a member of many other domestic and foreign scientific societies. He has lectured at Oxford and at French universities. He is the author of "Handbook of Psychology" (2 vols., 1889-1891); a translation of Ribot's "German Psychology of To-day" (1886); "Elements of Psychology" (1893); "Thoughts and Things" (1906-1911); "Individual and Society" (1910); etc. He was also editor-in-chief of the "Dictionary of Philosophy and Psychology," and a contributor of articles on psychology to "Johnson's Universal Cyclopædia" (1892-1895). He received the degree of D. Sc. from Oxford University in 1900.

BALDWIN, SIMEON EBEN, an American public official and jurist, born in New Haven, Conn., in 1840. He graduated from Yale University in 1861 and after studying law was admitted to the bar in 1863. From 1869 to 1872 he was instructor in law at Yale, and in 1872 became professor of law at that university. He was associate justice of the Connecticut Supreme Court from 1893 to 1907, and from 1907 to 1910 was chief justice of the State Supreme Court of Errors. In 1911 and in 1913 he was elected governor of Connecticut on the Democratic ticket. He was a member of commissions to revise the general statutes and the tax laws of the State, president of the American Bar Association in 1890, and a member of many other historical, legal, and economical associations. His publications include "Two Centuries' Growth of American Law" (1900); "American Railroad Law" (1904); "The Relation of Education to Citizenship" (1912); etc.

BÂLE. See BASEL.

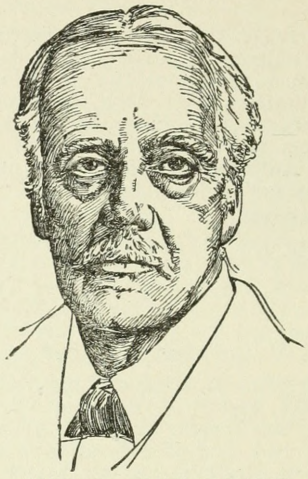
BALEARIC CRANE (*balearica pavonina*), a handsome species of crested crane, inhabiting N. W. Africa.

BALEARIC ISLANDS, a group of 4 large and 11 small islands, S. E. of Spain, including Majorca, Minorca, Iviza, and Formentera. The Romans annexed the islands in 123 B. C. after the destruction of Carthage which had held them previously. After being taken by the Vandals, under Genseric, and later by the Moors, they were taken in 1232 by James I., King of Aragon, and constituted a kingdom, which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1,935 square miles. Pop. about 350,000.

BALER, a town in the N. E. part of Luzon, Philippine Islands, on the Pacific coast. The town is noted for the heroic defense of a Spanish garrison in 1899, during a siege by the Filipinos, lasting 11 months. Baler was occupied by American troops in March, 1900. Pop. about 3,000.

BALFE, MICHAEL WILLIAM, composer, was born in Dublin, May 15, 1808. In his ninth year he made his début as a violinist, having begun to compose at least two years earlier. In 1823 he went to London, and, during 1825-1826, studied in Italy under Paer, Galli, Federici, and Rossini. In 1826 he wrote the music for a ballet, "La Pérouse," performed at Milan; and in 1827 he sang in the Italian opera at Paris with great success. In 1833 he returned to England, and in 1846 was appointed conductor of the London Italian Opera. He died Oct. 20, 1870. Of his numerous operas, operettas, and other compositions the most successful have been "The Bohemian Girl" (1843); "The Rose of Castile" (1857), and "Il Talismano" (1874). If Balfe was wanting in depth of dramatic force, he had command of orchestral resources; and his compositions are distinguished by fluency, facility, and melodic power.

BALFOUR, ARTHUR JAMES, a British statesman, born in Scotland, July 25, 1848; educated at Eton and at Trinity College, Cambridge; entered Parliament in 1874; was private secretary to his uncle, the Marquis of Salisbury, in 1878-1880, and accompanied him to the Berlin Congress; President of the Local Government Board in 1885; Secretary for Scotland in 1886; Chief Secretary for Ireland in 1887-1891; member of the Gold and Silver Commission in 1887-1888; First Lord of the Treasury in 1891-1892; became the leader of the Conservative opposition in the House of Commons in 1892. He was Prime Minister 1902-1905. He carried through the Education Act (1902) and the Irish Land Act (1904), and created the Committee of National Defense. Chamberlain's resignation as Colonial Secretary was followed by his campaign for Colonial preference and a protective tariff and led to the defeat of the Unionists in 1906. Balfour lost his seat for East Manchester, but was immediately returned from London. In 1911 Balfour resigned to Bonar Law leadership of the opposition. In 1915 he joined Asquith's coalition cabinet as First Lord of the Admiralty, and was Minister of Foreign Affairs, 1916-1919. In 1917 he visited the United States as a member of the British Commission. He was one of the British representatives at the Peace Congress of Versailles. In October, 1919, he was made Lord President of the Council. His publications include "A Defense of Philosophic Doubt" (1879); "Essays and Addresses" (1893); "The Foundations of Belief" (1895); "Insular Trade" (1903); "Criticism and Beauty" (1909); "Theism and Humanism" (1915).



ARTHUR JAMES BALFOUR

BALI, an island of the Indian Archipelago E. of Java, belonging to Holland; greatest length, 85 miles, greatest breadth, 55 miles; area, about 2,170 square miles. It consists chiefly of a series of volcanic mountains, of which the loftiest, Agoong (11,326 feet), became active in 1843, after a long period of quiescence. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mostly Brahmins in religion. It is divided into two districts and several autonomous states under native rajahs, and forms one colony with Lombok, the united population being estimated in 1918 at 1,344,880.

BALIOL, or **BALLIOL, JOHN**, of Barnard Castle, Northumberland, father



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of King John Baliol, a great English (or Norman) baron in the reign of Henry III., to whose cause he strongly attached himself in his struggles with the barons. In 1263 he laid the foundation of Baliol College, Oxford, which was completed by his widow, Devorguila or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, and of Margaret, eldest daughter of David, Earl of Huntington, brother of William the Lion. It was on the strength of this genealogy that his son John Baliol became temporary King of Scotland. He died in 1269.

BALIOL, or BALLIOL, JOHN, King of Scotland; born about 1249. On the death of Margaret, the Maiden of Norway, and grandchild of Alexander III., Baliol claimed the vacant throne by virtue of his descent from David, Earl of Huntington, brother to William the Lion, King of Scotland. Robert Bruce (grandfather of the King) opposed Baliol; but Edward I.'s decision was in favor of Baliol, who did homage to him for the kingdom, Nov. 20, 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but, after the defeat at Dunbar he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but, by the intercession of the Pope, in 1297, obtained liberty to retire to his Norman estates, where he died in 1315. His son, Edward, in 1332, landed in Fife with an armed force, and having defeated a large army under the Regent Mar (who was killed), got himself crowned King, but was driven out in three months.

BALIOL, or **BALLIOL COLLEGE,** Oxford, founded between 1263 and 1268 by John de Baliol, father of John Baliol, King of Scotland. The original foundation consisted of 16 poor scholars, and the revenue for their maintenance amounted for many years to only 8d. per week for each. From the 14th century on the college has been greatly enriched by various benefactions. The college consists of a master, 26 fellows and about 50 scholars and exhibitioners. John Wyclif was master of this college in 1361; its most famous master was Benjamin Jowett; among its scholars have been John Evelyn and Bradley the astronomer. Among eminent modern graduates were the poet Swinburne, Matthew Arnold, Hilaire Belloc, etc.

BALIZE. See BELIZE.

BALKAN PENINSULA, the usual name for the peninsula in southeastern Europe running southward between the Adriatic and the Ægean. The most convenient northern boundary is the Save and the lower Danube; though historically and politically Rumania and some parts of the former Austrian dominions are closely associated with the regions S. of the Danube. Greece is a peninsula upon a peninsula, but is not usually accounted one of the Balkan states.

The home of so many diverse races, the peninsula has long been a hotbed of warring interests. Previous to the World War the Turk's hand may be said to have been against every man's hand, and every other against the Turk. Greeks and Bulgarians intrigued each against the other with Russia, and looked on the inheritance of the peninsula as exclusively theirs by right. Bulgarian and Serb, though cherishing the Slavonic name, met in the bloody campaign of 1885-1886. Macedonia in especial was demanded alike by Greek, Bulgar and Serb. And the case was further complicated by the hostile faiths—Latin Christianity, Greek Church, both Orthodox and United, and Mohammedanism.

Greece, with the aid of the Great Powers, obtained her independence in 1836, as also did Serbia in 1830-1867. Wallachia and Moldavia (now united in the kingdom of Rumania) were made tributary principalities by the Peace of Paris, 1856. Rumania and Serbia obtained their complete independence by the Berlin Treaty of 1878—the former receiving the Dobrudja in exchange for a portion of Bessarabia, which was restored to Russia; the latter having its area enlarged. The same treaty handed over to Austria-Hungary the administration of Bosnia and Herzegovina and established the principality of Montenegro, the principality of Bulgaria, and the province of Eastern Rumelia, which was united with Bulgaria in 1886. As a result of the BALKAN WARS (*q. v.*) of 1912-1913 and the WORLD WAR (*q. v.*) of 1914-1918 various political readjustments took place. For political, statistical, and other details see ALBANIA, BULGARIA, GREECE, JUGOSLAVIA, MONTENEGRO, RUMANIA, SERBIA, TURKEY.

BALKAN WARS, two conflicts which took place in the Balkans in the years 1912 and 1913. The indirect cause of the war arose from long-standing conditions in the Balkan peninsula. These included a dissatisfaction of Turkish rule in those portions of the Balkans under Turkish sovereignty; and to dissatisfaction over relations with Turkey in those states which are ostensibly independent. Its immediate cause was the weakening of the Turkish Government, resulting in

the overthrow of the ruling power in 1908 by the Young Turk party, and by the series of wars carried on with Italy by Turkey for the possession of the Tripolitan hinterland.

The result of the policy carried on by the Young Turks on their accession to power in 1908 served to draw together the Christian nationalities in the Balkan peninsula in common hatred of the Turks. As a result of this, by the close of 1910, the Bulgarians and Greeks in Macedonia, who had hitherto been bitter enemies, became reconciled and this was followed by friendly relations between the governments of Greece and Bulgaria. Another result of the policy of the new Turkish régime was disorder and insurrection in Albania where formerly the tribesmen had been loyal to the Ottoman Empire. The Young Turks, however, undertook to abridge their privileges and deprive them of arms. Thereupon they rose in revolt. In August, 1912, the Albanians submitted to the Turkish Government a number of demands which included the establishment of military and civil reforms. The Turkish Government delayed in replying to these demands and had made no reply when the first Balkan War broke out. Both Montenegro and Serbia were directly concerned with the Albanian situation.

A similar policy created a like situation in Macedonia, and the Greek, Serbian, and Bulgarian inhabitants of that province received the sympathies of their own nationalities. Massacres by Turks in Bulgaria, Serbia, and Thessaly in 1912 added to the rising tide of hostility on the part of these nations toward Turkey. This situation became so threatening by October, 1912, that the Great Powers had united in an attempt to prevent war. These attempts, however, failed. On Oct. 13, 1912, Bulgaria, Serbia, and Greece dispatched an identical note to Turkey demanding the establishment of a complete autonomy under Christian government within six months. Upon receipt of this note Turkey immediately withdrew her representatives from the capitals of these countries. This was followed on Oct. 17 by a declaration of war against Turkey by Greece, Serbia, and Bulgaria.

Hostilities began at once. The military plans of the four Balkan powers had been well perfected, while the Turkish military organization had fallen into a state of inefficiency and unreadiness. The Balkan forces advanced rapidly into Turkish territory. On Oct. 19 a Bulgarian army of over 300,000 men occupied Mustapha Pasha, and Kirk-Kilisseh on Oct. 24. Adrianople was surrounded by Oct. 27 and continued in a state of siege thenceforward. The Bulgarian army on Oct. 29 won the bloody battle of Lule Burgas, which was the chief engagement of the war. It resulted in the utter defeat of the Turkish armies with a loss of over 35,000 men. The Turks now retreated to Tchorlu and then fell back behind the strong Tchatalja forts, the last line of defensives at Constantinople. The Bulgarian attempts to carry this line failed. On Nov. 13 the Turks opened negotiations for armistice, but their terms were rejected on Nov. 20. Five days later, however, a meeting was arranged between Bulgarian and Turkish commanders. These resulted in the preparation of a protocol for an armistice to last until the end of peace negotiations.

The Serbians also obtained quick success over the Turkish armies. This campaign ended in the capture of Durazzo.

In the meantime the Greeks, under the leadership of Crown Prince Constantine, had invaded Macedonia and won a number of easy successes. Saloniki was captured on Nov. 8. Entrance of Bulgarian and Serbian troops into the city on the following day gave evidence of jealousy among the Allies. The Greek Government declined to agree to the armistice terms and continued operations on land and sea. During the autumn and winter the Greeks captured the Ægean Islands not already occupied by Italy. The Montenegrin army met with successes and defeated Turkish forces in several encounters.

During the progress of hostilities, representatives of the Great Powers had continued their efforts in behalf of peace. The chief difficulty was found with the members of the Triple Alliance, especially Austria, which was hostile to any movement which would give Serbia a port on the Adriatic, or would cut off Austria-Hungary from the road to Saloniki. It was finally agreed that representatives of the Powers should confer in London and such a conference was held. Bulgaria, Serbia, Montenegro, and Turkey sent delegates to this conference. Greece insisted on being represented also, although she was still carrying on war against Turkey. Turkey refused to yield the territorial demands of the Allies and hostilities were resumed in Feb. 3, 1913. The Turks again sustained a number of defeats. The Great Powers again on March 1 offered mediation and two weeks later the Balkan Allies accepted. After a long deliberation Turkey agreed to accept the lines laid down by the Allies, leaving for future discussion other

questions, including the indemnity. A second armistice was signed on April 19, 1913, by all the belligerents except Montenegro which persisted in carrying on hostilities, capturing Scutari on April 23. Following this Montenegro acceded to the armistice. The second conference was held in London and the Balkan diplomats came to an agreement late in May, 1913. As a result of the agreement made, the Ottoman Empire was deprived of all her European possessions except Constantinople and a small tract of land east of the Maritza river.

The question of the division of the spoils at once arose among the Allies. Bulgaria claimed the greater part of Macedonia, to which also a claim was made by Serbia. Greece insisted upon retaining both Saloniki and Kavala, which had been occupied by her troops. Rumania, which had not joined the other Balkan nations, insisted upon "a strategic frontier" and for compensation for preserving neutrality during the war. The Bulgarian Government, encouraged by Austria-Hungary, made a sudden offensive against the Greeks and Serbians on June 30. On July 10 Rumania began hostilities, and the Turks, taking advantage of the discord among her enemies, advanced toward Adrianople. The Bulgarian armies were quickly defeated against these odds. Adrianople was captured by the Turks, and the Serbians and Montenegrins won quick success over the Bulgarian forces. King Ferdinand, in the face of these calamities, asked for peace. The Treaty of Bucharest followed which was signed on Aug. 6. By its terms Rumania secured important extension of her frontier. Bulgaria was obliged to yield an extensive area to Serbia and to Greece. She was also obliged to yield Adrianople to Turkey.

The bitter feeling which resulted from this brief campaign, and the resentment felt by Bulgaria toward Greece and the other Balkan nations, were a large factor in determining her entrance into the World War on the side of Germany, rather than that of the Entente nations.

BALKH (bälG), a district of Afghan Turkestan, the most northerly province of Afghanistan. It was for some time subject to the Khan of Bokhara. It corresponds to ancient Bactria, and is bounded on the N. by the river Oxus, on the E. by Badakhshan, on the S. by the Hindu Kush, and on the W. by the desert. Offsets of the Hindu Kush traverse it in a N. W. direction, and slope down to the low steppes of Bokhara. Its area is about 5,000 square miles. The soil has the general characteristics of a desert land; only a few parts are made fertile by artificial irrigation; and such are the vicissitudes of climate, that where grapes and apricots ripen in summer, and the mulberry tree permits the cultivation of silk, in winter the frost is intense, and the snow lies deep on the ground. The natives are Uzbegs.

BALKH, long the chief town, situated in a district intersected by canals and ditches, by means of which the waters of the Balkh-ab, or Dehâs, are dissipated and prevented from flowing toward the Amu-Daria, only 45 miles distant. It was twice destroyed by Genghis Khan and Timur. A terrible outbreak of cholera in 1877 caused the capital of Afghan Turkestan to be transferred to Mazar, W. of Balkh; since then Balkh has lost most of its former importance.

BALKHASH (bälG-ash'), (Kirghiz Tengis; Chinese Sihai), a great inland sea, near the E. border of Russian Central Asia, between 44° and 47° N. lat., and 73° and 79° E. long. Lying about 780 feet above sea-level, it extends 323 miles W. S. W.; its breadth at the W. end is 50 miles; at the E. from 9 to 4 miles; the area is 8,400 square miles. The water is clear, but intensely salty. Its principal feeder is the river Ili. It has no outlet.

BALL, SIR ROBERT STAWELL, an English astronomer, born in Dublin, July 1, 1840; studied at Trinity College. He was, successively, Professor of Applied Mathematics and Mechanics at the Royal Irish College of Science; Professor of Astronomy at Dublin; Lowdean Professor Astronomy at Cambridge; and Director of Cambridge Observatory, and Astronomer Royal for Ireland. His published works on mechanics and astronomy include "The Story of the Heavens"; "Starland" (1889); "The Earth's Beginnings" (1911); "Popular Guide to the Heavens" (1915). He was knighted in 1886, and died in 1913.

BALL, THOMAS, an American sculptor, born in Charlestown, Mass., June 3, 1819; studied in Italy; was engaged in painting in 1840-1852; adopted sculpture exclusively in 1851; resided in Florence, Italy, in 1865-1897, and afterward in Montclair, N. J. His best known works are the equestrian statue of Washington, in Boston; the Webster statue in Central Park, New York; the Washington Monument in Methuen, Mass.; and "Emancipation," in Washington, D. C. He published "My Three Score Years and Ten, an Autobiography" (1891); "History of American Sculpture" (1903). He died in Montclair, N. J., in 1911.

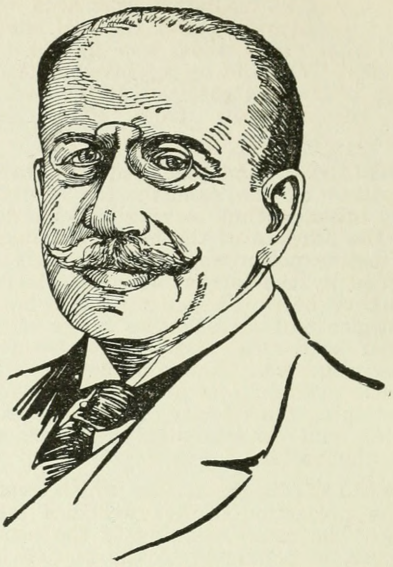
BALL AND SOCKET, a joint used in machinery and piping. It consists of a spherical end of a rod or pipe fitting into a hollow sphere of the same size on a like piece. The object of this joint is to provide a close, movable connection, and to prevent leakage in pipes.

BALLARAT, or BALLAARAT, an Australian town in Victoria, chief center of the gold-mining industry of the colony, and next in importance to Melbourne, from which it is distant W. N. W. about 75 miles. It consists of two distinct municipalities, Ballarat West and Ballarat East, separated by the Yarrowee creek, and has many handsome buildings, and all the institutions of a progressive and flourishing city. Gold was first discovered in 1851. The surface diggings having been exhausted, the precious metal is now got from mines as deep as some coal-pits, the gold being obtained by crushing the auriferous quartz. There are also foundries, woolen mills, flour mills, breweries and distilleries, etc. **Pop.** (1918) 39,970.

BALLAST, a term applied (1) to heavy matter, as stone, sand, iron, or water placed in the bottom of a ship or other vessel, to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aeronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the rails on a railway in order to make it firm and solid.

BALLENY ISLANDS, a group of five small volcanic islands, discovered in the Antarctic Ocean, in 1839, nearly on the Antarctic Circle, and in longitude 164° E. One contains Freeman's Peak (12,000 feet).

BALLIN, ALBERT, German shipmaster and financier. He was born in Hamburg, in 1857. He spent several years in England, studying the shipping conditions there, and returned to Germany, where in 1886, when only 29 years old, he became director-general of the Hamburg-America line, the great steamship line, whose operations spread all over the globe. His remarkable administrative and executive abilities were reflected in the growth of the organization, which at the outbreak of the World War had a capital of $37,500,000, gross yearly profits of $15,000,000, and 180 ships on its sailing lists. He was reputed to be a close friend and confidential adviser of the Kaiser, and it was stated that he exerted all his efforts during the conflict to prevent any action on the part of Germany that would bring



ALBERT BALLIN

the United States into the war. He died suddenly Nov. 10, 1918.

BALLIN, HUGO, an American artist, born in New York in 1879. He studied art in New York City and in Rome and Florence and was awarded many prizes both in the United States and in foreign countries, including the Hallgarten prize in 1907. His mural decorations are especially noteworthy, but examples of his easel printings are found in many private and public collections. He was a member of many societies of artists, of the National Institute of Arts and Letters, and since 1905 an Associate of the National Academy.

BALLINGER, RICHARD ACHILLES, an American public official, born in Boonesboro, Ia., in 1858. He was educated at the University of Kansas, Washington College, and Williams College, graduating from the latter in 1884. He was admitted to the bar in 1886 and for several years practiced law in Kankakee, Ill., and New Decatur, Ala. In 1889 he removed to Port Townsend, Wash., where he remained until 1897, when he removed to Seattle. He was United States Court Commissioner from 1890 to 1892, Judge of the Superior Court of Jefferson co., Wash., from 1894 to 1897, Mayor of Seattle from 1904 to 1906, Commissioner of the General Land Office in Washington from 1907 to 1909, and Secretary of the Interior of Presi-

dent Taft's Cabinet from 1909 to 1911. He resigned in the latter year as a result of a controversy over the coal lands in Alaska. His stand was upheld by President Taft and by an investigation, but to avoid embarrassment to the President he withdrew from office. See ALASKA.

BALLISTA, a machine used in military operations by the ancients for hurling heavy missiles, thus serving in some degree the purpose of the modern cannon. The motive power appears to have been obtained by the torsion of ropes, fibers, catgut, or hair. They are said to have sometimes had an effective range of a quarter of a mile, and to have thrown stones weighing as much as 300 lbs. A ballistic pendulum is an apparatus for ascertaining the velocity of military projectiles, and consequently the force of fired gunpowder.

BALLISTICS, the science which treats of the projection of heavy bodies into space. The usual meaning of the term, however, is restricted to the motion of projectiles fired from cannon or small arms. It forms an intricate and difficult study, including an accurate knowledge of mathematics. See ARTILLERY.

BALLISTRARIA, one of the names given to those projections with narrow apertures, frequent in the walls of old castles, and through which the crossbowmen discharged their arrows.

BALLON D'ALSACE (bäl-ôn' d'äl-säs'), or **ELSÄSSER BELCHEN**, one of the highest peaks of the Vosges Mountains; height, 4,101 feet.

BALLON DE GUEBWILLER, or **GEBWEILER BELCHEN**, the highest of the Vosges Mountains, in Alsace, France; height, 4,690 feet.

BALLOON. See AERONAUTICS.

BALLOT, a means of expressing an individual choice for a public or other officer or a measure of public importance; the medium through which a voter indicates his preference at an election.

The term ballot, at a club or private election, is applied to a ball used for the purpose of voting. In casting a ball for or against an individual, the arrangement sometimes is that if the vote be designed in his favor, then a white ball is used, but if it be intended to be against him, then one of a black color is used—whence the phrase "to blackball one."

In ancient Athens and the other Greek states the ballot was in use when votes had to be taken on political questions. In England it constituted one of the five points in the Chartist programme, both of the great political parties being at first opposed to it, as deeming it a revolutionary project. Gradually, however, the mass of the Liberal party ceased to fear the ballot, and opposition to it on the part of the Conservatives became less pronounced, till, at last, while Mr. Gladstone was in the plenitude of his power, a bill, legalizing it as an experiment for eight years, was passed during the session of 1872. In the United States the ballot was in use in the early colonial times.

Ballot reform is a term applied to such improvements in methods of voting as tend to eliminate unfairness at elections. In 1895 every State in the United States, excepting Georgia, Louisiana, North Carolina and South Carolina, had adopted some reformed plan of balloting, based on the Australian system, and modified to suit local conditions. The first States that adopted a reformed plan were Massachusetts, for the whole State, and Kentucky, for the city of Louisville, both in 1888. Subsequently, experience and legislation have led to a variety in the forms of the ballot, more than 40 States now employing the single "blanket-ballot." Two forms of the single ballot are in use: (a) One, following the Australian plan, in which the titles of the officers are arranged alphabetically, the names of the candidates and of the party following; (b) one which groups all names and offices by parties.

A newer feature of ballot reform is the substitution for the ballot paper, which is folded and deposited by hand, of a voting machine.

BALLOU, HOSEA (ba-lō'), an American Universalist clergyman, journalist, and historian, born at Halifax, Vt., Oct. 18, 1796; was the first President of Tufts College (1854-1861), and was very successful as editor of the "Universalist Magazine." He wrote "Ancient History of Universalism" (1829) and a hymn book (1837). He died at Somerville, Mass., May 27, 1861.

BALLOU, MATURIN MURRAY, an American journalist, born in Boston, April 14, 1820. Besides editing "Ballou's Pictorial," "Ballou's Monthly," etc., he wrote "History of Cuba" (1854); "Biography of Hosea Ballou," "Due West," "Due South" (1885); "Under the Southern Cross," "Footprints of Travel," etc. In 1872 he became one of the founders and the editor-in-chief of the Boston "Globe." He died in Cairo, Egypt, March 27, 1895.

BALL'S BLUFF, a spot on the right bank of the Potomac river, in Londoun co., Va., about 33 miles N. W. of Washington; where the bank rises about 150 feet above the level of the river. It is noted as the scene of a battle between a Union force under Col. Edward D. Baker, and a Confederate force under the command of General Evans, Oct. 21, 1861. The battle resulted in the serious defeat of the Union force and the instantaneous death of Colonel Baker.

BALMACEDA, JOSÉ MANUEL, a Chilean statesman, born in 1840; early distinguished as a political orator; advocated in Congress separation of Church and State; as Premier, in 1884, introduced civil marriage; elected President in 1886. A conflict with the Congressional party, provoked by his alleged cruelties and official dishonesty, and advocacy of the claim of Signor Vicuna as his legally elected successor, resulted in Balmaceda's overthrow and suicide in 1891.

BALMORAL CASTLE, the Highland residence of Queen Victoria, now owned by King George, beautifully situated on the S. bank of the Dee, in the county of, and 45 miles W. of Aberdeen.

BALSAM, the common name of succulent plants of the genus *impatiens*, family *balsaminaceæ*, having beautiful irregular flowers, cultivated in gardens and greenhouses. *Impatiens balsamina*, a native of the East Indies, is a common cultivated species. *Impatiens noli-me-tangere*, grows wild in Great Britain, but is not native.

BALSAM, an aromatic, resinous substance, flowing spontaneously or by incision from certain plants. A great variety of substances pass under this name. But in chemistry the term is confined to such vegetable juices as consist of resins mixed with volatile oils, and yield the volatile oil on distillation. The balsams are either liquid or more or less solid; as, for example, the Balm of Gilead, and the balsams of copaiba, Peru, and Tolu. The balsams are used in perfumery, medicine, and the arts.

BALTIC PROVINCES, a term which comprehends the three former Russian governments bordering on the Baltic, viz., Courland, Livonia, Esthonia. Since the European War they are independent states. The Baltic provinces once belonged to Sweden, except Courland, which was a dependency of Poland. They came into the possession of Russia partly in the beginning of the 18th century, through the conquests of Peter the Great, partly under Alexander in 1809. They form, however, a borderland between the Germanic and Slavonic areas, and have been a frequent cause of difficulty between Germany and Russia. In 1905, the Letts and Esthonians revolted against the German land owners and Russian Government, when much property was destroyed. Area 35,614 square miles; pop. about 2,750,000.

BALTIC SEA, the great gulf or inland sea bordered by Denmark, Germany, Russia, and Sweden, and communicating with the Kattegat and North Sea by the Sound and the Great and Little Belts. Its length is from 850 to 900 miles; breadth, from 100 to 200; and area, including the Gulfs of Bothnia and Finland, 184,496 square miles, of which 12,753 are occupied by islands. Its shallowness and narrowness, its numerous islands and reefs, the shoal coasts of Prussia on the one side, and the rocky coast of Sweden on the other, make the navigation of the Baltic very dangerous. The group of the Aland Islands divides the S. part of the sea from the N. part or Gulf of Bothnia. The Gulf of Finland, branching off eastward into Russia, separates Finland from Esthonia. A third gulf is that of Riga or Livonia. The water of the Baltic is colder and clearer than that of the ocean, and contains only a fourth of the proportion of salt found in the Atlantic. Ice hinders the navigation of the Baltic from three to five months yearly. Upward of 250 rivers flow into this sea, which, through them and its lakes, drains rather less than one-fifth of all Europe, its drainage area being estimated as 717,000 square miles. The chief of these rivers are the Oder, Vistula, Niemen, Dwina, Narva, Neva; the waters of Lake Maeler, and those of Wetter and other lakes reach the sea through the river Motala. The principal islands are Zealand, Fünen, Bornholm, Samsöe, Laaland, Gottland, Oland, Hveen, the Aland Islands and Rügen. Timber, hides, tallow, and grain are the exports from the countries bordering on the Baltic.

BALTIMORE, the largest city of Maryland, on Patapsco river, about 14 miles from Chesapeake Bay, and on the Baltimore and Ohio, the Pennsylvania, Western Maryland, and other railroads. It extends over 6 from E. to W. and between 4½ and 5 miles from N. to S., covering an area of 31½ square miles. Its convenient situation in relation to shipping has produced an increased industrial growth in recent years. One of the largest of these developments is the

Sparrows Point plant of the Bethlehem Steel Co., which has grown to be one of the largest steel plants of the world, employing between 15,000 and 20,000 persons. Baltimore is one of the largest wholesale centers of the United States and acts as a distributing and jobbing point for a large area. It is on the threshold of the great Maryland, Pennsylvania, and West Virginia coal fields. Electric power is generated on a large scale from McCall's Ferry on the Susquehanna river. This supplies the power for the large industrial plants of the city. Baltimore is called the Monumental City, from the number of memorials found within its borders. These include the Washington Monument, Battle Monument, the Wells McComas, the William Wallace, the Howard, the Confederate, the Francis Scott Key, and the Soldiers' and Sailors' Monument. The city is notable for the large number of handsome public buildings. These include the city hall, postoffice, custom house, Johns Hopkins Hospital, Masonic Temple, and a court house. The city is the center of a large agricultural and fruit-growing center and is notable for its public markets. It has one of the most excellent harbors on the Atlantic coast, and its growth as a port has been remarkably rapid in recent years. Shipbuilding is one of the most important of its industries and during the World War a large number of vessels were constructed in the shipbuilding yards of the city. There are over 30 miles of wharfage and water front within the city limits. A uniform depth of 35 feet is maintained up to the piers, providing for transatlantic steamships. Over $21,000,000 has been expended by the United States Government for improving the channel approaches. There is an elaborate system of municipally owned wharves, chiefly constructed of concrete, a number of large modern grain elevators with a total capacity of nearly 7,000,000 bushels, and a floating dock of 12 marine railways and three dry docks. Many steamship companies engaged in transatlantic and other foreign trade have their terminals in Baltimore. Local companies also operate over 70 steamers in the Chesapeake Bay in coastwise trade.

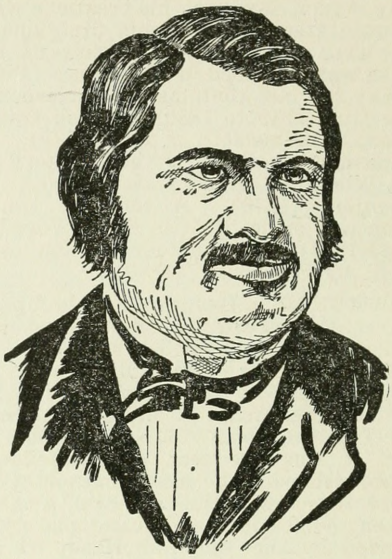
The city has many important educational institutions. The best known of these is the Johns Hopkins University. Others are St. Mary's Seminary, Loyola College, Culture College for Women, Morgan College (colored), and St. Joseph's Seminary (colored). There is an excellent system of public schools in which are enrolled over 80,000 pupils. The city is notable for many handsome churches, including a Roman Catholic Cathedral, Grace Episcopal Church, First Presbyterian Church, and others. There are many large retail stores. The banking facilities are unusually good. The exchanges in the clearing house for the year 1919 amounted to $4,196,983,000. an increase of $1,291,911,000 over the previous year. The industries of the city are varied. Among the most important are men's, women's, and children's clothing, shipbuilding, public utility electric equipment, steel rails and products, automobiles, boilers, fertilizers, drugs, machinery, structural iron, chemicals, etc. The city was founded in 1729 and the advantage of its situation resulted in a growth which placed it ahead of older towns in trade. During the War of 1812 the city was attacked by land and water, but was successfully defended. During the bombardment of Fort McHenry, Francis Scott Key, who was held on board a British vessel, composed "The Star Spangled Banner." The construction of the Chesapeake and Ohio canal and the Baltimore and Ohio railroad resulted in rapid increase in the industrial importance of the city. It suffered severely from loss of trade during the Civil War, but the revival was rapid. On Feburary 7, 1904, fire destroyed most of the business center of the city, causing a loss of over $125,000,000. Within three years the burned area was practically rebuilt. The growth in population has been steady and rapid. Pop. (1890) 434,439; (1900) 508,957; (1910) 558,485; (1920) 732,826.

BALTIMORE, GEORGE CALVERT, LORD, an English colonist, born in Yorkshire about 1580; was for some time Secretary of State to James I., but this post he resigned in 1624 in consequence of having become a Roman Catholic. He retained the confidence of the King, who, in 1625, raised him to the Irish peerage. He had previously obtained a grant of land in Newfoundland, but left it, obtaining another patent for Maryland. He died (1632) before the charter was completed, and it was granted to his son, Cecil.

BALTIMORE BIRD, BALTIMORE ORIOLE, BALTIMORE HANG-NEST, or **BALTIMORE**, a bird of the family *sturnidæ* (starlings), and the sub-family *oriolinæ* (orioles). It is the *oriolus baltimore* of Catesby, now *icterus baltimorii*. The name Baltimore was applied, because its colors, black and orange, were the same as those on the coat of arms or livery of the Lord Baltimore who was formerly proprietor of Maryland.

BALUCHISTAN, a country in Asia, the coast of which is continuous with the N. W. seaboard of India, bounded on the N. by Afghanistan, on the W. by Persia, on the S. by the Arabian Sea, and on the E. by Sind. It has an area of about 135,000 square miles, and a population estimated at 850,000. The general surface of the country is rugged and mountainous, with some extensive intervals of barren, sandy deserts, and there is a general deficiency of water. The country is almost entirely occupied by pastoral tribes under semi-independent sirdars or chiefs. The inhabitants are divided into two great branches, the Baluchis and Brahuis, differing in their language, figure, and manners. The Baluchis in general have tall figures, long visages, and prominent features; the Brahuis on the contrary, have short, thick bones, with round faces and flat lineaments, with hair and beards frequently brown. Both races are zealous Mohammedans, hospitable, brave, and capable of enduring much fatigue. The Khan of Khelat is nominal ruler of about one half of the total area, and in 1877 concluded a treaty with Great Britain, which placed the whole country at the disposal of the British for military purposes. Another part, area 46,960 square miles, called British Baluchistan, is administered by a chief commissioner. The balance of the country consists of a native state called Las Bela (7,132 square miles) and various tribal areas (7,268 square miles).

BALZAC, HONORÉ DE (bälts-ac'), a French author, born at Tours, May 20, 1799. He was educated at the Collége de Vendôme and studied law at the Sorbonne. In opposition to his father's wish that he should become a notary, he left Tours in 1819 to seek his fortune as an author in Paris. From 1819 to 1830 he led a life of frequent privation and incessant industry, producing stories and becoming burdened with debt. He first tasted success in his 30th year on the publication of "The Last of the Chouans," which was soon afterward followed by "The Magic Skin," a marvelous interweaving of the supernatural into modern life, and the earliest of his great works. After writing several other novels, he formed the design of presenting in the "Human Comedy" a complete picture of modern civilization, especially in France. All ranks, professions, arts, trades, all phases of manners in town and country, were to be represented in his imaginary system of things. In attempting to carry out this impossible design, he produced what is almost in itself a literature. The stories composing the "Human Comedy" are classified as "Scenes of Private Life, of Parisian Life, of Political Life, of Military Life," etc. Each of the actors in the brilliant crowded drama is minutely described and clothed with individuality, while the scenes in which they move are set forth with a picturesqueness and verisimilitude hardly to be matched in fiction. Among the masterpieces which form part of Balzac's vast scheme may be mentioned "Lost Illusions," "The Peasants," "The Woman of Thirty," "Poor Relations," "The Quest of the Absolute," and "Eugénie Grandet." The "Droll Stories" (1833) stand by themselves. He wrote 85 novels in 20 years, and he was not a ready writer, being very fastidious in regard to style, and often expending more labor on his proof sheets than he had given to his manuscript. In his later years he lived principally in his villa, Les Jardies, at Sèvres. In 1849, when his health had broken down, he traveled to Poland to visit Madame Hanska, a rich Polish lady, with whom he had corresponded for more than 15 years. In 1850 she became his wife, and three months after the marriage, in August of the same year, Balzac died at Paris. His influence on literature has been deep and many-sided, and novelists with so little in common as Feuillet and Zola alike claim him for their master. He studied character and the machinery of society in a scientific spirit, but he was not content with the photographic reproduction of fact. He was a visionary as well as an analyst, an idealist and a realist in one. His work bears trace of



HONORÉ DE BALZAC

the strain with which it was produced; it is often coarse, often extravagant, occasionally dull. But few writers give such an impression of intellectual force and in the power of investing his creations with apparent reality he stands first among novelists. The *édition definitive* of his works was published in 25 volumes (1869-1875); the last contains his correspondence from 1819 to 1850 (English translation, with memoir, 2 vols., 1879). A supplemental volume is the "History of the Works of Honoré de Balzac," by Lovenjoul (1879). A complete translation was made by Miss K. P. Wormley (1889-1894) and another edition was edited by Saintbury (1899).

BAMBERG, a Bavarian city in Upper Franconia, beautifully situated on the banks of the Regnitz, 3 miles above its confluence with the Main, and 33 miles N. of Nuremberg by rail. Set in the midst of vineyards, orchards, and hop-gardens, and founded about 769, from 1007 to 1802 it was the seat of independent prince-bishops. The most noteworthy of its 14 churches is the cathedral, a magnificent edifice in the Romanesque style, founded by the Emperor Henry II. in 1004, and containing the tomb of his Empress Cunigunda. St. Michael's Benedictine Abbey (1009) was in 1803 converted into an almshouse. The ruins of the castle of Altenburg, originally the seat of the Counts of Babenberg, are near the town. The inhabitants are chiefly engaged in the manufacture of beer, cotton, cloth, gloves, tobacco, musical instruments, etc. A large export trade in liquorice and garden seeds is carried on. Albrecht Pfister, one of the earliest printers, was practicing his art at Bamberg in 1461. Pop. about 50,000.

BAMBOO, any species of the botanical genus *bambusa*, and especially the best known one, *bambusa arundinacea*. It is a giant grass, sometimes reaching the height of 40 or more feet, which is found everywhere in the tropics of the Eastern Hemisphere, and has been introduced into the West Indies, the Southern States of America, and various other regions of the Western world. It has the usual characteristics of a grass—the cylindrical stem, of flinty hardness externally, while soft or even hollow within.

The uses to which the several species of bamboo are put in the regions where they grow are almost innumerable. In housebuilding they furnish the framework of the sides and roof, with the joists and other parts of the flooring. Bows, arrows, quivers, the shafts of lances, and other warlike weapons can be made from the stems of bamboo, as can ladders, rustic bridges, the masts of vessels, walking sticks, water pipes, flutes. The seeds are eaten by the poorer classes in parts of India; and in the West Indies the tops of the tender shoots are pickled and made to supply the place of asparagus.

BANANA, a fruit originally East Indian, but much cultivated in warm countries over the whole globe. It is now generally regarded as a mere variety of the plantain. The banana has, generally, dark purple stripes and spots on the stems, and the fruit is smaller, less curved, and of a more delicate taste than the plantain, with a soft and luscious pulp. Each fruit is generally about four or five inches long. The banana is always used in a ripe state, and never, like the plantain, as a substitute for bread.

BANANA, an island in West Africa, N. of the mouth of the Kongo; also a seaport of the Kongo Free State on the island.

BANANA-BIRD, a bird *xanthornus icterus*, belonging to the family *sturnidæ* (starlings), and the sub-family *oriolinæ*, or orioles. It is tawny and black, with white bars on the wings. It occurs in the West Indies and the warmer parts of continental America.

BANAS, or **BUNAS**, the name of three rivers of India. (1) A river of Rajputana, rising in the Aravulli Mountains, flows N. E. through Mewar for 120 miles, then S. E., and falls into the Chambal, after a total course of 300 miles; (2) a river which also rises in the Aravulli Mountains, and, after a southwestward course of 180 miles, is lost in the Runn of Cutch; (3) a river of Chutia Nagpur, Bengal, has a northwestward course of about 70 miles, and falls into the Sone, near Rampur.

BANAT, a large and fertile region, formerly belonging to Hungary, consisting of the counties of Temesvar, Torontal, and Krisso; principal town, Temesvar. The region originally belonged to Hungary; was occupied by the Turks in 1652-1716; and was reunited to Hungary in 1799. By the treaty signed at Versailles on June 4, 1920, the Banat became part of Rumania. Area, 11,009 square miles. Pop. about 1,600,000.

BANBURY, a small town of Oxfordshire, on the Oxford canal and the Cherwell, 23 miles N. of Oxford, and 78 N. W. of London by rail. Its strong castle, built about 1125, was demolished during the Great Rebellion, when Banbury was noted for Puritanical zeal. In

1469 the Yorkists were defeated in the vicinity. The town is still famous for its cakes and ale, as it was in Ben Jonson's day; and it manufactures webbing and agricultural implements. Pop. about 14,000.

BANCA, an island belonging to the Dutch East Indies, between Sumatra and Borneo; area about 4,450 square miles. A large part of the population is Chinese. It is celebrated for its excellent tin, but it produces nothing else of any importance. Pop. (1917) 154,178.

BANCROFT, GEORGE, an American historian, born near Worcester, Mass., Oct. 3, 1800. He was educated at Harvard and in Germany. In 1824 he published a translation of Heeren's "Politics of Ancient Greece," and a small volume of poems. Between 1834 and 1840 three volumes of his History of the United States were published. In 1845 he was appointed Secretary of the Navy. He was American Minister to England from 1846 to 1849, when the University of Oxford conferred on him the honorary degree of D. C. L. The fourth and fifth volumes of his history appeared in 1852. The sixth appeared in 1854, the seventh in 1858, the eighth soon after, but the ninth did not appear till 1866. From 1867 to 1874 he was Minister Plenipotentiary at the Court of Berlin. The 10th and last volume of his great work appeared in 1874. An additional section appeared, first as a separate work, in 1882: "History of the Formation of the Constitution of the United States," and the whole came out in six volumes in 1884-1885. He settled in Washington on returning from Germany, in 1875, and died there Jan. 17, 1891.

BANCROFT, HUBERT HOWE, an American historian, born in Granville, O., May 5, 1832. In 1852 he went to California to establish a book business, and began to collect documents, maps, books and MSS. for a complete "History of the Pacific States" from Mexico to Alaska. He published "Native Races of the Pacific States" (1875-1876); "History of the Pacific States" (1882-1891); a series of "Chronicles of the Builders of the Commonwealth"; "The New Pacific" (1907); "Retrospection" (1912); etc. He died in 1918.

BANCROFT, SIR SQUIRE, an English actor and manager, born in London in 1841. His first appearance on the stage was made in Birmingham in 1861. This was followed by seasons in Dublin and Liverpool, after which he appeared in London at the Prince of Wales Theater in 1865. In 1871 he married Miss Wilton and with her took up the management of the Prince of Wales Theater. From 1880 to 1885 he also managed the Haymarket Theater. He and his wife then retired from active management. He appeared at the Lyceum with Henry Irving in 1889 and subsequently took part in several presentations at the Garrick and other theaters. He was knighted in 1897.

BANDA ISLANDS, a group belonging to Holland, Indian Archipelago, S. of Ceram, Great Banda, the largest, being 12 miles long by 2 broad. They are beautiful islands, of volcanic origin, yielding quantities of nutmeg. Goenong Api, or Fire Mountain, is a cone-shaped volcano which rises 2,320 feet above the sea. Pop. about 9,500.

BANDA ORIENTAL, a state of South America, originally settled by Spaniards from Buenos Aires, claimed by Brazil, but, after a war, made in 1825 into the independent state of Banda Oriental del Uruguay—*i. e.*, Eastern Bank of the Uruguay, now usually called simply URUGUAY (*q. v.*).

BANDED PEAK, or **MT. HESPERUS**, a peak of the San Juan Mountains, in southern Colorado; altitude, 12,860 feet.

BANDELIER, ADOLPH FRANCIS ALPHONSE, a Swiss-American archæologist, born in Berne, Aug. 6, 1840; settled early in the United States, where he carried out important work under the direction of the Archæological Institute of America. His studies have been chiefly among the Indians of New Mexico and Arizona, Central America and Mexico. He was the author of "Art of War and Mode of Warfare" (1877); "Social Organization and Government of Ancient Mexicans" (1878); "Tenure of Lands and Inheritances of Ancient Mexicans" (1878); "An Archæological Tour Into Mexico" (1885); a novel of Pueblo Indian life, "The Delight Makers"; "The Gilded Man"; etc. He died at Madrid in 1914.

BANDHOLTZ, HARRY HILL, an American soldier, born in Constantine, Mich., in 1864. He graduated from the United States Military Academy in 1890, was commissioned 2d lieutenant in the same year and rose through the various grades, becoming brigadier-general in 1918. For a time he acted as professor of military science and tactics at the Michigan Agricultural College. During the Spanish-American War he served with the 7th Infantry and also saw service in the Philippines, where, in 1902-1903, he was governor of Tayabas prov-

ince. He was colonel and assistant chief of the Philippine constabulary, and at the same time was in command of the District of Southern Luzon. He was active against outlaws, and succeeded in capturing the leaders in several uprisings. From 1907 to 1913 he was brigadier-general and chief of the Philippine constabulary. In 1914 he served on the Mexican border, remaining until February, 1918, when he became chief of staff of the 58th Infantry Brigade; he was provost-marshal-general of the American Expeditionary Force from September, 1918, to August, 1919. In the latter year he served as American member of the Interallied Military Mission to Hungary.

BANDONG, or **BANDUNG**, a flourishing commercial town in the center of the western end of Java, in the vicinity of the volcano Gunong Guntour. Since 1864 it has been the capital of a province known as the Preanger Regencies. Pop. about 22,000.

BANFF, a health resort in southwestern Alberta, Canada. It is on the Canadian Pacific railroad and the Bow river. The village, which has a population of about 1,000, has its situation in the magnificent scenery of the Canadian Rockies. There are several fine hotels, sulphur springs, open-air baths, and a sanitarium. It is included in the Rocky Mountain National Park of Canada, which has an area of over 5,000 square miles.

BANFFSHIRE, a county in Scotland in the northeast division. It has an area of 630 square miles. The surface is for the most part hilly, with some fertile valleys and pasture land. Agriculture and fishing are the leading occupations. The chief towns are Banff, Macduff, Keith, and Buckie. Pop. about 65,000.

BANGALORE, a town of Hindustan, capital of Mysore, and giving its name to a considerable district in the E. of Mysore state. The town stands on a healthful plateau 3,000 feet above sea-level. In the old town stands the fort, reconstructed by Hyder Ali in 1761, and taken by Lord Cornwallis in 1791. There are manufactures of silks, cotton cloths, carpets, gold and silver lace, etc. Pop. about 200,000. The Bangalore district has an area of nearly 3,000 square miles and a population of over 800,000.

BANGKOK, the capital city of Siam, situated on both banks of the Menam, about 20 miles from its mouth, and in 14° N. lat., and 100° 20′ E. long. The population is about 550,000, nearly half of whom are Chinese, the others including Burmese, Annamese, Cambodians, Malays, Eurasians, and Europeans. The foreign trade of Siam centers in Bangkok, and is mainly in the hands of the Europeans and Chinese. The approach to Bangkok by the Menam, which can be navigated by ships of 350 tons burden (large sea-going ships anchor at Paknam, below the bar at the mouth of the river), is exceedingly beautiful. Stone buildings are used only for the royal palaces, some noblemen's houses, monasteries, and the dwellings of Europeans. A large number of the houses float on rafts, fastened by ropes to poles; most of the trade of the city is carried on upon the river. Much of the internal traffic of Bangkok is carried on by means of canals, but in recent years numerous streets and roads have been built; there are now also electric street railways, electric lights, and four railway stations. The native houses on land—of bamboo or other wood, like the floating houses—are raised upon piles, six or eight feet from the ground, and are reached by ladders. The circumference of the walls of Bangkok, which are 15 to 30 feet high, and 12 broad, is about 6 miles. Bangkok is the constant residence of the King and the seat of foreign legations and consulates. The palace is surrounded by high walls, and is nearly a mile in circumference. It includes temples, public offices, accommodation for officials and for some thousands of soldiers, with their necessary equipments, a theater, apartments for a crowd of female attendants, and several Buddhist temples, or chapels. Throughout the interior are distributed the most costly articles in gold, silver, and precious stones. The temples of Bangkok are innumerable and decorated in the most gorgeous style, the Siamese taking a pride in lavishing their wealth on them. In the neighborhood of Bangkok are iron mines and forests of teak-wood. The chief exports are rice, sugar, pepper, cardamoms, sesame, hides, fine woods, ivory, feathers, and edible birds' nests. There is regular steamship service with Singapore, Saigon, and Hong Kong. See SIAM.

BANGOR, city, port of entry, and county-seat of Penobscot co., Me.; at the junction of the Penobscot and Kenduskeag rivers, on the Maine Central, and Bangor and Aroostook railroads; 140 miles N. E. of Portland. It is at the head of navigation on the Penobscot river; is divided into two parts by the Kenduskeag; and derives excellent power for manufacturing from the Penobscot river,

by means of a dam near the water works. The city has direct connection with the Canadian Pacific railway, and also by steamers with New York, Boston, and important points on the New England coast. Water for domestic, fire, and small manufacturing purposes is also obtained from the Penobscot river by the Holly system. Bangor is one of the most important lumber centers in the country, and, besides its many saw, planing, and molding mills, has several wood-pulp mills, iron foundries, carriage factories, ship-building yards, agricultural implement works, boot, shoe and moccasin factories, pork packing establishments, etc. It is a trade center for five counties, and is connected by electric railway with their principal cities and towns. There are several National banks; daily, weekly, and monthly periodicals; and various educational and charitable institutions, the most important of which is the BANGOR THEOLOGICAL SEMINARY (*q. v.*). The site of the city, called by the Indians Kenduskeag, was visited by the French, who erected a fort here, called Norombega, in 1656. The place was permanently settled in 1769; was incorporated as a town in 1791, and became a city in 1834. Pop. (1910) 24,803; (1920) 25,978.

BANGOR, a borough of Pennsylvania, in Northampton co. It is on the Lackawanna, and Lehigh and New England railroads, and has important slate quarrying interests, silk mills, machine shops, and other industries. Pop. (1910) 5,369; (1920) 5,404.

BANGOR, a city and seaport of Wales in Carnarvonshire. It is on the S. E. bank of the Menai Strait. The beauty of the surrounding scenery has made Bangor a much-sought-for place of resort. It is the seat of the oldest bishopric in Wales and has a cathedral begun in 1496. The city has several important educational institutions, including the University College of North Wales and other colleges. The chief industry is slate quarrying. Pop. about 15,000.

BANGOR THEOLOGICAL SEMINARY, an educational institution in Bangor, Me.; chartered by the Legislature of Massachusetts in 1814; opened in Hampden in 1816; and removed to Bangor in 1819; under the direction of the Congregational Church, but open to all Christian young men. It has a three years' course; grounds and buildings valued at over $400,000; a library of about 30,000 volumes; and, in 1919, 5 professors and instructors; and 18 students.

BANGS, JOHN KENDRICK, an American humorist and editor, born in Yonkers, N. Y., May 27, 1862. He graduated from Columbia College and was one of the founders of "Life," and has long been known for his light verse and humorous stories, among which may be mentioned "Coffee and Repartee" (New York, 1886); "Mr. Bonaparte of Corsica" (1895); "Water Ghost and Other Stories" (1896); "The Bicyclers and Other Farces" (1896); "A Houseboat on the Styx" (1896); "The Pursuit of the Houseboat" (1897); "Foothills of Parnassus" (1914). He was at various times editor of "Harper's Weekly" (1900); "Metropolitan" (1903); "Puck" (1904).

BANK, primarily an establishment for the deposit, custody and repayment on demand, of money; and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. The term is a derivative of the banco or bench of the early Italian money dealers.

Divisions.—In respect of constitution there is a broad division of banks into public and private; public banks including such establishments as are under any special state or municipal control or patronage, or whose capital is in the form of stock or shares which are bought and sold in the open market; private banks embracing those which are carried on by one or more individuals without special authority or charter and under the laws regulating ordinary trading companies. In respect of function three kinds of banks may be discriminated: (1) banks of deposit merely, receiving and returning money at the convenience of depositors; (2) banks of discount or loan, borrowing money on deposit and lending it in the discount of promissory notes, bills of exchange, and negotiable securities; (3) banks of circulation or issue, which give currency to promissory notes of their own, payable to bearer and serving as a medium of exchange within the sphere of their banking operations. The more highly organized banks discharge all three functions, but all modern banks unite the two first. For the successful working of a banking establishment certain resources other than the deposits are, of course, necessary, and the subscribed capital, that is, the money paid up by shareholders on their shares and forming the substantial portion of their claim to public credit, is held upon a different footing to the sums received from depositors. It is usually considered that for sound banking this capital should not be traded for the purpose of making gain in the same

way as the moneys deposited in the bank; and that is, for the most part, invested in government or other securities subject to little fluctuation in value and readily convertible into money. But, in any case, prudence demands that a reserve be kept sufficient to meet all probable requirements of customers in event of commercial crises or minor panics.

Methods.—Of the methods of making profit upon the money of depositors, one of the most common is to advance it in the discounting of bills of exchange not having long periods (seldom more than three months with the Bank of England) to run; the banker receiving the amounts of the bills from the acceptors when the bills arrive at maturity. Loans or advances are also often made by bankers upon exchequer bills or other government securities, on railway debentures or the stock of public companies of various kinds, as well as upon goods lying in public warehouses, the dock-warrant or certificate of ownership being transferred to the banker in security. To banks of issue a further source of profit is open in their note circulation, inasmuch as the bank is enabled to lend these notes, or promises to pay, as if they were so much money and to receive interest on the loan accordingly, as well as to make a profitable use of the money or property that may be received in exchange for its notes, so long as the latter remain in circulation. A considerable number of the notes issued will, however, be retained in circulation at the convenience of the public as a medium of exchange; and on this circulating portion a clear profit accrues. This rapid return of notes through other banks, etc., in exchange for portions of the reserve of the issuing bank, is one of the restraints upon an issue of notes in excess of the ability of the bank to meet them. In England a more obvious restraint upon an unlimited note issue, originating partly in a desire for greater security, partly in the belief that the note augmentation of the currency might lead to harmful economic results in its influence upon prices, is to be found in the bank acts of 1844 and 1845, which impose upon banks of issue the necessity of keeping an equivalent in gold for all notes issued beyond a certain fixed amount.

In specific relation to his customer the banker occupies the position of debtor to creditor, holding money which the customer may demand at any time in whole or in part by means of a check payable at sight on presentation during banking hours. For the refusal to cash a check from the erroneous supposition that he has no funds of his customer's in his hands, or for misleading statements respecting the position in which the bank stands, the banker is legally responsible. Moreover, the law regards him as bound to know his customer's signature, and the loss falls upon him in event of his cashing a forged check. In their relations to the community, the chief services rendered by banks are the following: By receiving deposits of money, and massing in sums efficient for extensive enterprises the smaller savings of individuals, they are the means of keeping fully and constantly employed a large portion of the capital of the community which, but for their agency, would be unproductive; they are the means by which the surplus capital of one part of a country is transferred to another, where it may be advantageously employed in stimulating industry; they enable vast and numerous money transactions to be carried on without the intervention of coin or notes at all, thus obviating trouble, risk, and expense. The mechanism by which the last of these benefits is secured is to be found in perfection in the clearing-house system.

History.—In the 12th century almost the whole trade of Europe was in the hands of the Italian cities, and it was in these that the need of bankers was first felt. The earliest possible bank, that of Venice, established in 1171, and existing down to the dissolution of the republic in 1797, was, for some time, a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a public loan. The important Bank of Amsterdam, taken by Adam Smith as a type of the older banks, was established in 1609, and owed its origin to the fluctuation and uncertainty induced by the clipped and worn currency. The object of the institution (established under guarantee of the city) was to give a certain and unquestionable value to a bill on Amsterdam; and for this purpose the various coins were received in deposit at the bank at their real value in standard coin, less a small charge for recoinage and expense of management. For the amount deposited a credit was opened on the books of the bank, by the transfer of which payments could be made, this so-called bank money being of uniform value as representing money at the mint standard. Banks of similar character were established at Nuremberg and other towns, the most important being the Bank of Hamburg, founded in 1619. In England there was no corresponding institution, the London merchants being in the habit of lodging their money at the Mint in the Tower, until Charles I. appropriated the whole of it (£200,000) in

1640. Thenceforth they lodged it with the goldsmiths, who began to do banking business in a small way, encouraging deposits by allowing interest (4d. a day) for their use, lending money for short periods, discounting bills, etc. The bank-note was first invented and issued in 1690 by the Bank of Sweden, founded by Palmstruck in 1688.

Bank of England.—The Bank of England, the most important banking establishment in the world, was projected by William Paterson. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 toward carrying on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation, denominated the Governor and Company of the Bank of England. The company thus formed advanced to the government £1,200,000 at an interest of 8 per cent.—the government making an additional bonus or allowance to the bank of £4,000 annually for the management of this loan (which, in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital had been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000, in 1816, since which no further augmentation has taken place. There exists besides, however, a variable "rest" of over £3,000,000. The issue department of the bank was established as distinct from the general banking department, the sole business intrusted to the former being the issue of notes. The bank is now permitted to issue notes against securities to the amount of £18,450,000, but for every note that the issue department may issue beyond this total an equivalent amount of coin or bullion must be paid into the coffers of the bank. The Bank of England notes are, therefore, really equivalent to, and at any time convertible into, gold. At the end of 1919 the total of notes issued was £108,748,000. Notes once issued by the bank and returned to it are not reissued but are destroyed—a system adopted in order to facilitate the keeping of an account of the numbers of the notes in circulation, and so prevent forgery.

The total deposits and post bills of the banking department at the end of 1919 was £199,862,000.

The management of the bank is in the hands of a governor, deputy-governor and 24 directors, elected by stockholders who have held £500 of stock for six months previous to the election. A director is required to hold £2,000, a deputy-governor £3,000, and a governor £4,000 of the stock.

Other English Banks.—The other English banks consist of numerous joint stock and private banks in London and the provinces, many of the provincial establishments of both kinds having the right to issue notes. Private banks in London with not more than six partners have never been prevented from issuing notes, but they could not profitably compete with the Bank of England. The maximum issues of the provincial banks are limited to a certain amount against which they are not compelled to hold gold in reserve, and they have no power to issue against specie in excess of the fixed circulation. Their actual issues are considerably below this amount.

In Scotland there are no private banks, the only banks in that portion of the United Kingdom being the Bank of Scotland (1695), the Royal Bank of Scotland (1727), the British Linen Company (1746), and 10 other joint-stock banks of issue, with many branches. By the act of 1845 new banks of issue were prohibited, a monopoly being given to such establishments as existed in the year previous to May 1, 1845. At the same time the issue of each was limited to the amount of its average circulation during that year, together with the specie held at the head office. Any bank issuing notes in excess of this limit is supposed to hold an equivalent amount in gold.

The banks in Ireland consist of one public or National bank, the Bank of Ireland, 8 joint-stock and several private banks. The authorized note circulation is arranged on the same footing as that of the Scotch banks. If any bank discontinues its issue and issues notes of the Bank of Ireland, the circulation of the latter may be, to an equal amount, increased.

In Canada the banks are not allowed to issue notes of lower denominations than $5, notes for small amounts up to $4 being issued by the Dominion Government; and the banking laws are such that there is no possibility of holders of bank-notes being losers by them.

Bank of France.—Of all other banks, the Bank of France is second in importance only to the Bank of England. It was established in the beginning of the 19th century, at first with a capital of 45,000,000 francs, and with the exclusive privilege in Paris of issuing notes pay-

able to bearer, a privilege which was extended in 1848 to cover the whole of France. It has numerous branches in the larger towns. The government appoints the governor and two deputy governors, who are all required to be stockholders. There is also a body of 15 directors and 3 censors, nominated by the shareholders. The capital of the Bank of France is fixed at 182,500,000 francs. The value of its note circulation in 1920 was 38,355,755,000 francs.

Detailed information regarding banks in other countries will be found in the separate articles on the respective countries. For banks in the United States see BANKS, FEDERAL RESERVE; BANKS IN THE UNITED STATES.

Banks for Savings.—Savings banks are banks established for the reception of small sums so as to be taken advantage of by the poorer classes, and they are carried on entirely for behoof of the depositors. One of the earliest was an institution in which small sums were received and interest allowed on them, established by Mrs. Priscilla Wakefield, at Tottenham, near London, in 1803. The first savings bank in Scotland was formed in 1810 by the Rev. Henry Duncan, of Ruthwell, Dumfriesshire. In 1814 the Edinburgh Savings Bank was established on the same principles, and the system soon spread over the kingdom. The first act relating to savings banks was passed in 1817. By it all deposits in savings banks, as soon as they reached £50, were placed in the hands of the National Debt Commissioners, who allowed interest on them. In 1824 it was enacted that the deposits for the first year should not exceed £50, nor those in subsequent years £30, the total deposits being limited to £150; also, that no more interest should be paid when the deposits, with compound interest accruing on them, standing in the name of one individual, should amount to £200. This enactment is still in force. Postoffice savings banks were established in Great Britain in connection with the money order department of the postoffice, by an act of Parliament passed in 1861. Any sum not less than a shilling is received, so as not to exceed £30 in one year, or more than £150 in all; and when the principal amounts to £200, the payment of interest is to cease. Interest is paid on every complete pound at the rate of 2½ per cent. For the deposits the government is responsible, and they may be drawn from any postoffice savings bank in the kingdom. By an act that came into operation in 1880, any person desiring to invest in Government stock any sum of from £10 to £100, can do so through the postoffice banks at a trifling cost, and obtain the dividend free of charge. In the United States postal savings banks were established in 1911. Savings banks are now well known in all civilized countries, and the good they have done is incalculable. In the United States there is an enormous amount of money deposited in them. School savings banks are the most recent institutions of this kind, and have had a marked effect for good. See SAVINGS BANKS.

BANKHEAD, JOHN HOLLIS, United States Senator from Alabama, born in Marion co., Ala., in 1842. He was educated in the common schools and served in the Civil War, rising to the rank of captain. He was a member of the Alabama House of Representatives from 1865 to 1867, and again in 1880 and 1881. In 1876 and 1877 he was a member of the State Senate. He was elected to the National Congress in 1877, serving until 1907. In 1906 he was elected alternate United States Senator, and in 1897 was elected Senator to succeed Senator Morgan. He was re-elected in 1911 and 1918. During his service he was a member of many important committees in the Senate, including the Commission on Public Buildings, Commission on Rivers and Harbors, and the Inland Waterways Commission. He was the author of several important books relating to post roads.

BANK NOTE, an engraved certificate representing its face value in specie. In the production of bank notes, the principal purpose is to render their forgery impossible, or at least easy of detection. This is sought to be effected by peculiarity of paper, design, and printing. Bank of England notes are printed in one of the blackest and most indelible of inks, on paper expressly made for the purpose by one firm only. It is a handmade paper, remarkable for its strength, lightness and difficulty of imitation. Its peculiar water mark constitutes one of the chief safeguards of the notes against forgery. No Bank of England notes are issued twice, so that this mark is rarely indistinct, and the paper does not lose its peculiar crispness.

In the United States, the bank notes at present in circulation are manufactured by the Government Bureau of Engraving and Printing, the paper being made by a private concern, under a patented process, the chief ingredients being a mixture of linen and cotton fiber, into which are introduced threads of silk, so arranged as to be perceptible after the notes are printed. This style of

paper is furnished only to the Government. Superior skill is exercised in engraving the plates, nearly all parts of them being executed by the geometrical lathe and the ruling machine the work of which it is impossible to imitate successfully by hand. The printing of the notes is done in colored inks of the best quality, sometimes as many as four shades being used. The great expense of the machines used in the engraving, and the superior quality of the work generally, renders successful counterfeiting almost impossible. The notes, when badly worn, are returned to the United States Treasury, other notes being issued in their stead.

BANKRUPTCY LAWS, regulations passed by a competent authority with a view to distributing the property of an insolvent equitably among his creditors and free the debtor from further obligation. In England, before 1841, only a tradesman could be a bankrupt. The distinction was then abolished. It was abolished in the United States in 1869. The act "to establish a uniform system of bankruptcy throughout the United States," was passed by both houses of the 55th Congress, and by the approval of President McKinley, became a law on July 1, 1898. It was subsequently amended in 1903, 1906, 1910, 1911, 1915, and 1917.

The provisions under which a man can be thrown into bankruptcy against his will are as follows: (1) Where a man has disposed of his property with intent to defraud. (2) Where he has disposed of his property to one or more creditors to give a preference to them. (3) Where he has given a preference through legal proceedings. (4) Where a man has made a voluntary assignment for the benefit of his creditors generally. (5) Where a man admits in writing that he is bankrupt. The last two provisions are practically voluntary proceedings. Under the common law, a man is considered insolvent when he cannot pay his debts when they are due; under the new law, he is deemed insolvent only when his property, fairly valued, is insufficient to pay his debts. Only two offenses are cited under the new law: one when property is hidden away after proceedings in bankruptcy have been begun, and the other when perjury is discovered. Discharges are to be denied in only two cases: one, in which either of the offenses detailed has been committed, and the other, when it is shown that fraudulent books have been kept. The term of imprisonment for either of these offenses is not to exceed two years.

The law provides a complete system throughout the United States, and for its administration by the United States courts in place of the different systems formerly in existence in the various States administered by State courts. In bankruptcy proceedings, a bankrupt debtor may turn over all his property to the court, to be administered for the benefit of his creditors, and then get a complete discharge from his debts. A bankrupt may of his own motion offer to surrender his property to the administration of the United States court and ask for his discharge in voluntary bankruptcy, or creditors may apply to the court to compel a bankrupt to turn over his property to be administered under the act for the benefit of the creditors in voluntary bankruptcy. The bankrupt who has turned over all his property and conformed to the provisions of the act, is entitled to a judgment of court discharging him from any future liability to his creditors.

Provision is made in the act for allowing bankrupts to compromise or settle with their creditors by a proceeding known as composition proceedings, whereby, if a bankrupt and a majority of his creditors agree upon some basis of settlement, the same, if approved by the court, shall become binding upon all creditors.

BANKS, FEDERAL RESERVE, the Federal Reserve system is primarily a result of the currency disturbances of 1907-1908 which were promptly followed by the passage of the Aldrich act providing for an emergency circulation not to exceed $500,000,000. The conditions of this bill were so strict, however—having been framed just after an extreme crisis and suitable only for such an emergency—that no issue was ever undertaken under its provisions. It had stirred up legislative agitation of the subject, however, and in 1910 a commission under Senator Nelson A. Aldrich of Rhode Island, its original promulgator, set seriously to work on the whole question of banking reform.

This National Monetary Commission spent three years in expert investigation of banking conditions here and in Europe.

Senator Aldrich meanwhile offered in 1911 a reorganization plan the chief feature of which was a National Reserve Association, consisting of a central bank—whose stock should be distributed to other banks through the country—which should have the control through the election of a majority of the directors. Associate or local systems

were to be formed, also controlled by the local banks which were members.

This measure assigned to the National Reserve Bank—which should hold a reserve from all the banks, and rediscount the paper of the local associations—the function of controlling the credit of the whole system and thus limiting local panics. It also has the power to issue notes on general assets to promote elasticity of the currency. It can also take up the bonds of the local banks which the government will gradually refund in 3 per cent. bonds that will find buyers in the general market. The National Monetary Commission offered a bill the year following which was essentially the same.

The measure was taken up by the Special Session of Congress in 1913, and discussed in all its bearings till it was finally passed with some change on Dec. 23, 1913.

Under this enactment the United States is divided for facilitating the banking inter-relations of the country into twelve districts whose headquarters are in twelve principal cities of the country under the control of a Central Reserve Board. This board is composed of the Secretary of the Treasury (ex-officio), the Comptroller of the Currency (ex-officio), and five bankers appointed for terms of ten years by the President.

A Federal Advisory Council is also provided for, consisting of twelve members, one elected by each of the twelve district Reserve banks, to confer when necessary with the Board.

Each district bank is governed by a directorate, three of whose members are the appointees of the Federal Reserve Board; the others appointed by the bank itself. Every National bank is required, and every State bank is permitted, under certain conditions, to subscribe to the stock of the Federal Reserve bank in its district to the extent of 6 per cent. of its own capital and surplus. In this way the paid-in capital of the twelve Federal Reserve banks at the date of our entering the war with Germany was about 56 millions; the largest bank, New York, having very close to twelve millions; the smallest, Atlanta, $2,414,000. The district banks have the power to create branches for dealing in Government and other securities, and to rediscount commercial paper for their associate members. They may also be called on by the Federal Reserve Board to rediscount paper for other Federal Reserve banks.

The district banks are empowered to purchase from members Government bonds held for circulation, and take out circulation on them. As an alternative these bonds may be changed to 3 per cent. bonds without circulation. This provision is for the purpose of gradually retiring the note circulation secured by bond. Treasury notes made by the Government are offered as a new circulatory element. The Federal Reserve bank requiring these must place rediscounted commercial paper in the hands of a director who is designated as a Federal Reserve Agent. The circulation of these notes is guaranteed by the bank of a reserve in gold of 40 per cent. of their face value.

The system is divided into three classes: Central-reserve cities, where the total reserves are required to be 18 per cent. of demand liabilities and 5 per cent. of time deposits; reserve cities, where the reserves are required to be 15 per cent. and 5 per cent.; and other banking centers where they must be 12 per cent. and 5 per cent. For two years after the law was passed the latter class was required to hold five-twelfths of its reserve in its own vaults; thereafter four-twelfths. The remainder of the reserves of the banks in the reserve cities were to be gradually withdrawn until five-twelfths had been so redeposited, and by the end of the third year the entire reserve must be held either in the banks' vaults or by the Federal Reserve bank. The reserves of reserve, and Central-reserve cities must be similarly readjusted until, in the former case, five-fifteenths are held in the banks' vaults, and six-fifteenths in the Federal Reserve bank—in the latter case, six-eighteenths and seven-eighteenths, respectively. At the end of a period of three years the unassigned reserve shall be either in the banks' own vaults or the Federal Reserve bank.

The Federal Reserve banks are not chartered primarily for profit. The capital of the Federal Reserve banks is owned by the member banks, subject to a cumulative dividend of 6 per cent. Profits in excess of this revert to the Government, with the provision that one-half of these excess profits shall be diverted to the creation of a surplus fund for the Federal Reserve bank until the fund shall have reached 40 per cent. of the capital of that bank. Primarily the duty of the Federal Reserve banks is to act as the custodian and guardian of the bank reserves of their member banks. Next is their duty to render a service to their member banks, and through them in turn to the general public in equalizing and stabilizing interest rates.

The Federal Reserve banks came into being in November, 1914, and notwith-

standing that American bankers had gained through five years of discussion a better understanding of the deplorable defects in the American banking and currency system, the managers of the new Federal Reserve banks found that the welcome accorded them by the banks of the country at large was cool. This was because they did not really understand the new régime. The breaking out of the Great War was the immediate influence in their organization—requiring as it did the best banking talent and machinery in the country. The immense imports of gold from abroad following the outbreak of the war, and the general prosperity stimulated by war profits kept the system at once from proving its great value

For three years, from its formation up to our own entry into the struggle, in April, 1917, it was, however, gradually finding itself. When this great test came the Federal Reserve banks were prepared for its great responsibilities. During the first year of war the system took a high place in the confidence and esteem of both bankers and business men.

BANKS, LOUIS ALBERT, an American clergyman and writer, born at Corvallis, Ore., in 1855. He was educated at Philomath College and Boston University, and he entered the Methodist ministry in 1879. After several years as pastor in Kansas City he engaged in evangelistic work in 1911. In 1893 he was Prohibition candidate for governor of Massachusetts. He was the author of many books on religious subjects, including "Windows for Sermons" (1902); "The Great Portraits of the Bible" (1903); "The Religious Life of Famous Americans" (1902); "The Problems of Youth" (1909); "A Summer in Peter's Garden" (1913); "Ammunition for the Final Drive on Booze" (1917).

BANKS, NATHANIEL PRENTISS, an American legislator and soldier, born in Waltham, Mass., Jan. 30, 1816. At first a factory worker, he studied law, and became successively a member of the State and National Legislatures. He was Speaker of Congress in 1856, and in 1857, 1859, and 1861 was elected Governor of his native State. On the outbreak of the Civil War, he took a command in the army, at first on the Potomac, then at New Orleans, and finally on the Red River. Relieved of his command in 1864, he re-entered Congress, voting mainly with the Republican party. He died in Waltham, Sept. 1, 1894.

BANKS, THOMAS, an English sculptor, born in 1735. He studied sculpture in the Royal Academy, and in Italy, where he executed several excellent pieces, particularly a bas-relief representing Caractacus brought prisoner to Rome, and a Cupid catching a butterfly, the latter work being afterward purchased by the Empress Catharine. Among his other works was a colossal statue of "Achilles Mourning the Loss of Briseis," in the hall of the British Institution, and the monument of Sir Eyre Coote, in Westminster Abbey. He died in 1805.

BANKS IN THE UNITED STATES, financial institutions comprising (1) National banks; (2) State banks; and (3) savings banks, consisting of (a) mutual savings banks; and (b) stock savings banks. These are general throughout the entire country. In addition to these, are (1) co-operative banks, common in New England, especially Massachusetts; (2) loan and trust companies, established in nearly all the large cities; and (3) building and loan associations, now represented in most of the States and Territories. The last three classes partake of some of the features of regular banking, especially in the reception of money on deposit, subject to call, and the payment of interest thereon. The first three kinds of banks only are here considered; the others will be found under their respective titles.

National Banks.—There were on November 17, 1919, 19,129,842 depositors in National banks. These figures show that the depositors in the National banks of the country exceed in number one-sixth of the total number of the population in that year. The number of depositors increased from 1910 to 1919 11,439,374, or 148.75 per cent.

On June 30, 1919, there were 21,338 State banking institutions which included savings banks, private banks, and trust companies. The aggregate paid in stock in these institutions amounted to a combined capital of $1,318,716,000 and the total resources to $26,380,529,000. The deposits amounted to $21,744,046,000.

The State banks numbered 17,225 with a combined capital of $785,727,000 and aggregate resources of $11,701,606,000. The deposits amounted to $9,046,919,000. There were 622 mutual and 1,097 stock savings banks in 1919. The deposits in the mutual banks amounted to $4,422,096,000 with 9,011,464 depositors. In the same year there were 1,377 loan and trust companies with resources amounting to $7,959,969,000 and deposits amounting to $5,696,030,000. There are approximately 3,500 private banks in the United States, of which only about 1,000 are under supervision of the

State or National banking departments. The deposits in these banks amounted to $219,830,000. See POSTAL SAVINGS BANKS; BANKS, FEDERAL RESERVE; SAVINGS BANKS; etc.

The following tables, compiled from the report of the Comptroller of the Currency (Dec. 1, 1919), give a comprehensive view of the development of the National banking system in recent years:

GROWTH OF NATIONAL BANKS BY FIVE-YEAR PERIODS

[In thousands of dollars]

Date	Number of banks	Total deposits	Loans and discounts[1]	Reserve held	Excess reserves
Sept. 7, 1899	3,595	$3,459,611	$2,496,751	$890,569[2]	$259,780
Sept. 6, 1904	5,412	5,131,210	3,726,151	1,244,465[2]	334,678
Sept. 1, 1909	6,977	7,079,570	5,128,882	1,605,932[2]	346,886
Sept. 12, 1914	7,538	8,187,569	6,400,767	1,577,666[2]	116,955
Nov. 17, 1919	7,865	17,467,853	12,240,718	1,264,482[3]	59,562

Date	Number of banks	Capital	Surplus and undivided profits	Circulation	Total resources
Sept. 7, 1899	3,595	$605,773	$350,516	$200,346	$4,650,355[1]
Sept. 6, 1904	5,412	770,778	583,137	411,231	6,975,087[1]
Sept. 1, 1909	6,977	944,642	801,738	658,040	9,573,954[1]
Sept. 12, 1914	7,538	1,060,332	1,011,482	918,270	11,483,529[1]
Nov. 17, 1919	7,865	1,153,752	1,340,300	680,879	22,444,992

[1] Includes rediscounts.
[2] Includes cash on hand and due from reserve agents.
[3] Besides the $1,262,339,000 carried with reserve banks on Nov. 17, 1919, the member national banks held on that date cash in vaults amounting to $450,041,000 and had $2,443,599,000 due from other banks.

History.—The first bank in the United States was organized in Philadelphia in 1780, and a bank of North America was planned in 1781 and opened in 1782. The Massachusetts Bank was incorporated in 1784; that of New York was chartered in 1791, although since 1784, under Alexander Hamilton's "Articles of Association," it had been doing business. Alexander Hamilton also originated a plan for a United States bank, with a capital of $10,000,000, three-fourths to be paid in United States stock, at 6 per cent., which plan was adopted and approved by Washington in 1791. The bank was reorganized in 1816 with a capital of $35,000.000, the United States subscribing $7,000,000, with interest at 6 per cent., but in consequence of a general financial depression, was, the next year, in great danger of failure. Congress refusing to renew the charter, a State bank, called the United States Bank, was chartered in Pennsylvania, and eventually failing, the whole account was settled in 1856. The $28,000,000 deposited by shareholders was totally lost, while the Government realized $6,093,167 upon its investments of stock. State banks were afterward chartered in the interest of individuals and dominant political parties. The charters were sometimes fraudulently obtained and currency issued to three times the amount of their capital, and, in 1814, 1837, and 1857, many of them suspended payment. A reform movement in bank currency was inaugurated in Massachusetts in 1825, and a "safety-fund" system, recommended by Mr. Van Buren, adopted in 1829. In 1838 the Free Bank Act passed the New York Legislature, which authorized any number of persons to form a banking association, subject to certain specified conditions and liabilities.

On Feb. 25, 1863, the National banking system was organized, but the act establishing it was modified by that of June 3, 1864. This provided for a National Bank Bureau in the Treasury Department, whose chief officer is the Comptroller of the Currency. Under it National banks could be organized by any number of individuals, not less than five, the capital to be not less than $100,000 except in cities of a population not exceeding 6,000; in these banks could be established with a capital of not less than $50,000. In cities having a population of 50,000 the capital stock could not be less than $100,000. One-third of the capital was required to be invested in United States bonds, which were deposited in the Treasury for security, upon which notes were issued equal in amount to 90 per cent. of the current market value, but not exceeding 90 per cent. of the par value; and these notes were receivable at par in the United States for all payments to and from the Government, except for duties on imports, interest on the public debt, and in redemption of the national currency. On

March 3, 1865, an act was passed by which the circulation of the State banks was taxed 10 per cent., which drove their notes out of existence. The original act authorized the issue of $300,000,000 of circulation; that of May 12, 1870, increased it to $354,000,000.

The act of Jan. 14, 1875, authorized the unlimited issue of circulating notes, subject to the terms of the law, but made it the duty of the Secretary of the Treasury to retire legal tender notes to the extent of 80 per cent. of the additional circulating notes until the legal tender notes should be reduced to $300,000,000. The banks were required to pay annually 1 per cent. tax on their circulation, and ½ per cent. on their average deposits and on their average capital not invested in United States bonds. By act passed March 3, 1883, the taxes on capital and deposits of banks, bankers and National banking associations, except such as were already due and payable, were repealed, and also the stamp tax on bank checks, drafts, orders, and vouchers after July 1, 1883. The original act of Feb. 25, 1863, limited the period of existence of the National banks to 20 years; but, on July 10, 1882, an act was passed, approved by the President July 12, which provided for the extension of the corporate existence of all National banks upon compliance with certain conditions, for 20 years. Many of the banks took advantage of the law, and reorganized under the act, though some of them under a different name. By the act of June 3, 1864, each association was entitled to an existence of 20 years from date of organization. The War Revenue Act of 1898 imposed a stamp tax of two cents on every bank check.

Currency Act of 1900.—On March 14, 1900, President McKinley approved a new currency act, which, among other things, established the gold dollar as the standard unit of value, and placed at a parity with that standard all forms of money issued or coined by the United States. The bill also made a number of important changes in the regulations governing National banks. The law permitted National banks, with $25,000 capital, to be organized in places of 3,000 inhabitants or less, whereas the minimum capital previously was $50,000. It also permitted banks to issue circulation on all classes of bonds deposited up to the par value of the bonds instead of 90 per cent. of their face, as before.

BANKS LAND, an island in the W. of Arctic America, discovered by Parry in 1819, explored by Maclure in 1850, and named by him Baring Island. It is separated by Banks Strait from Melville Island, lying to the N. W., and by Prince of Wales Strait from Prince Albert Land, lying eastward.

BANN, two rivers in the N. E. of Ireland—the Upper Bann, flowing into, and the Lower Bann, out of, Lough Neagh. The Upper Bann rises in the Mourne Mountains, and runs 25 miles N. N. W. through the counties of Down and Armagh. The Lower Bann, strictly the continuation of the Upper, issues from the N. W. corner of Lough Neagh, and flows 40 miles N. N. W., through Lough Beg, dividing the counties of Antrim and Londonderry. It runs past Coleraine, into the Atlantic Ocean. It has important salmon and eel fisheries.

BANNOCKBURN, a village of Stirlingshire, Scotland, 3 miles S. S. E. of Stirling, on the Bannock Burn, a little affluent of the Forth. It is an important seat of the woolen manufactures, especially of carpets and tartans. Tanning is carried on to some extent, and the neighboring villages are noted for the manufacture of nails; while coal abounds in the vicinity. In the great battle of Bannockburn, fought on June 24, 1314, Robert Bruce, with 30,000 Scotch, gained a signal victory over Edward II., with 100,000 English, and secured his throne and the independence of Scotland.

BANQUETTE (bäng-ket'), in fortification, the elevation of earth behind a parapet, on which the garrison of defenders may stand.

BANTOCK, GRANVILLE, an English composer and conductor of music, born in London in 1868. He studied at the Royal Academy of Music where he won the Macfarren Prize in his first year in 1889. From 1893 to 1896 he was editor of "The New Quarterly Musical Review." In the latter year he became conductor of G. Edwardes' opera company. In the following year he was appointed municipal director of music at New Brighton, where he established an orchestra and choral society which, from the excellence of its performances, attracted wide attention. He was conductor of the Liverpool Orchestral Association in 1903, and in 1908 was appointed professor of music in Birmingham University. He was a prolific producer of operas and other music. His special interest and attention were given to English music. His best known operas are "The Pearl of Iran" (1896);

and the symphonic poems, "Dante" (1902); "The Fire Worshippers" (1892); and "Saul" (1907).

BANTRY BAY, a deep inlet in the S. W. extremity of Ireland, in County Cork. It is 25 miles long, running E. N. E. with a breadth of 4 to 6 miles. At the head of the bay is the seaport Bantry, a famous summer resort. Pop. about 3,500. It is one of the finest harbors in Europe, affording safe and commodious anchorage for ships of all sizes. Here a French force attempted to land in 1796. The coast around is rocky and high.

BANTU, the ethnological name of a group of African races dwelling about 6° N. lat., and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Kongo, etc., but not the Hottentots. The term Bantu is also used to denote the homogeneous family of languages spoken in Africa throughout the vast region lying between Kamerun, Zanzibar, and the Cape of Good Hope, with the exception of the Hottentot, Bushmen, and Pigmy enclaves.

BANYAN TREE, the *ficus indica*, a species of the genus *ficus*. It is regarded as a sacred tree by the Hindus. Its branches produce long shoots or aerial roots, which descend to the ground and penetrate the soil; so that, in course of time, a single tree becomes a vast umbrageous tent, supported by numerous columns.

The fruit of the banyan is of a rich scarlet color, and about the size of a cherry; it is eaten by the monkeys, which live with birds and enormous bats in the thick forest of branches. The bark is a powerful tonic. The white glutinous juice of the tree is used to relieve toothache, as an application to the soles of the feet when inflamed, and for making birdlime. *Ficus elastica*, which is also a native of India, yields an inferior kind of caoutchouc. *Ficus sycamorus*, the sycamore fig, is said to have yielded the wood from which mummy-cases were made.

BAOBAB, a tree also styled the monkey-bread, African calabash, or Ethiopian sourgourd tree. It has a fantastic look, its stem being of little height, but of great thickness; one specimen was found 30 feet in diameter. The fruit is about 10 inches long. Externally it is downy; within this down is a hard, woody rind, containing an eatable pulp, of slightly acid taste. The juice mixed with sugar is serviceable in putrid and pestilential fevers. The *adansonia* is properly a native of Africa, but it has been introduced into India. It is known as *Adansonia digitata*, being so named after Adanson, a celebrated French traveler, who lived from 1749 to 1754 in Senegal. The tree is liable to be attacked by a fungus which, vegetating in the woody part, renders it soft and pithlike. By the negroes of the W. coast these trunks are hollowed into chambers, and dead bodies are suspended in them.

BAPAUME (ba-pōm'), a French town in the department of Pas-de-Calais, 12 miles S. of Arras. Here, on Jan. 2 and 3, 1871, took place two bloody struggles between the French Army of the North and the Prussian "army of observation"; the French were defeated, with heavy losses. It was again the scene of much and very heavy fighting during the World War (1914-1918) and changed hands several times. As a result the largest part of the town was destroyed. See ARRAS, BATTLES OF.

BAPTISM (from the Greek *baptizō*, from *bapto*, to immerse or dip), a rite which is generally thought to have been usual with the Jews even before Christ, being administered to proselytes. From this baptism, however, that of St. John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Matt. xxviii; 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments. In the primitive Church the person to be baptized was dipped in a river or in a vessel, with the words which Christ had ordered, generally adopting a new name to further express the change. Sprinkling, or, as it was termed, clinic baptism, was used only in the case of the sick who could not leave their beds. The Greek Church and Eastern schismatics retained the custom of immersion; but the Western Church adopted or allowed the mode of baptism by pouring or sprinkling, since continued by most Protestants. This practice can be traced back certainly to the 3d century, before which its existence is disputed. Since the Reformation there have been various Protestant sects called Baptists, holding that baptism should be administered only by immersion, and to those who can make a personal profession of faith. The Montanists in Africa baptized even the dead, and in Roman Catholic countries the practice of baptizing church bells—a

custom of 10th century origin—continues to this day. Being an initiatory rite, baptism is only administered once to the same person. The Roman and Greek Catholics consecrate the water of baptism, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but, among most Christians, it is preceded by a confession of faith made by the person to be baptized, if an adult, and by his parents or sponsors if he be a child. The Roman Catholic form of baptism is far more elaborate than the Protestant. This church teaches that all persons not baptized are damned, even unbaptized infants are not admitted into heaven; but for those with whom the absence of baptism was the chief fault, even St. Augustine himself believed in a species of mitigated damnation. Protestants hold that though the neglect of the sacrament is a sin, yet the saving new birth may be found without the performance of the rite which symbolizes it. Naming the person baptized forms no essential part of the ceremony, but has become almost universal, probably from the ancient custom of renaming the catechumen.

BAPTISTS, a Protestant denomination based on the belief that immersion is the only Scriptural mode of baptism, and that those only are proper subjects for this ceremony who are converted and profess personal faith in Christ. They thus reject both infant baptism and baptism by sprinkling or pouring of water as invalid. There are, however, other sects, including the Mennonites, the Christians, the Disciples of Christ, etc., who accept the prominent principles of the Baptists in whole or in part, and yet are not classified with them, owing to some minor differences. The Baptists first appeared in Switzerland, in 1523, and soon spread to Germany, Holland, and other continental countries, whence they were driven to England by persecution on account of their rejection of infant baptism. The first regularly organized church was Arminian, and was established in 1610 or 1611. A Calvinistic Baptist Church was founded about 1633. Those holding Arminian views received the name of General Baptists, and those holding Calvinistic views, the name of Particular Baptists.

The Baptists in the United States spring historically from the English and Welsh Baptists; but the first Baptist Church was organized by Roger Williams, who was a minister in the Massachusetts Colony previous to his immersion. After being immersed, in 1639, by Ezekiel Holliman, whom he in turn immersed with 10 others, he organized a Baptist Church in Providence, R. I. There were other Baptists, however, who emigrated from England in the 17th century, and, before the end of the 18th century, became numerous in New England, New York, Pennsylvania, Virginia, Georgia, and other States. In all the British colonies, excepting Rhode Island, the Baptists were persecuted for a long time. After the Revolutionary War the Baptists increased with great rapidity, especially in the South and southwestern States, and have steadily increased ever since.

There are at present three principal bodies of Regular Baptists, the Northern, the Southern, and the Colored, all of whom agree in doctrinal and ecclesiastical principles, but each has its own associations, State Conventions and general missionary and other associations. In 1845 a controversy concerning slavery, caused a division between the Baptists in the Northern and those in the Southern States, after which the Northern Baptists continued to support the Home Mission Society and the American Baptist Missionary Union, on an anti-slavery basis. The Southern Division is the largest branch of white Baptists. After the division of 1845 the Southern churches established the Southern Baptist Convention, which holds annual meetings. It is composed of representatives from associations, other organizations, and from the churches. The Colored Baptists compose the largest body of Regular Baptists, those being included who have separate churches, State Conventions, and associations. The Colored Baptists of the North are generally members of churches belonging to white associations. In 1866 the first State Convention of Colored Baptists was organized in North Carolina. Besides these associations there are the American National Convention, which deliberates upon questions of general concern; the Consolidated American Missionary Convention, the General Association of the Western States and Territories, the New England Missionary Convention, and the Foreign Missionary Convention of the United States.

Besides the three large divisions of Baptists, there are several smaller ones: The Six Principle Baptists, Seventh Day Baptists, Free Will Baptists, Original Free Will Baptists, General Baptists,

Separate Baptists, United Baptists, Baptist Church of Christ, Primitive Baptists, Two-Seed-in-the-Spirit Baptists, Regular Baptists, etc. The Free Will Baptists joined the Regular Baptists in 1911.

All Baptist denominations are congregational in polity. Each church, under its officers of pastor and deacons, manages its own affairs. There are Associations and State Conventions, composed of pastors and delegates from the churches, but none of these bodies have any ecclesiastical authority. Councils, consisting of ministers and laymen, may be called to advise churches, to ordain ministers, or to recognize new churches at the invitation of individual churches.

Statistics of the Churches.—The following table gives a summary of the various Baptist Churches in the United States:

	Organizations	Members	Ministers
North	8,178	1,227,448	8,631
South	23,692	2,711,591	15,946
Colored	21,754	3,018,341	19,423
Other (14 bodies)	5,156	279,270	4,992

The total membership of the Baptist Church in 1920 was estimated as follows: United States and Canada, 7,600,000; British Isles, 408,000; elsewhere, 1,000,000; world total, 9,008,000.

BAPTIST YOUNG PEOPLE'S UNION OF AMERICA, an association representing numerous young people's societies connected with the Baptist Churches in all the States and in Canada, organized in June, 1891, in Chicago, Ill., which place has since been its headquarters and the place of publication of its monthly magazine "Service." Conventions are held yearly.

BARABBAS, a noted robber in Christ's time, who was imprisoned and awaiting death for the crimes of sedition and murder. It was a custom of the Roman government, for the sake of conciliating the Jews, to release one Jewish prisoner, whom they might choose at the yearly Passover. Pilate desired thus to release Jesus, but the Jews demanded Barabbas (Matt. xxvii:16-26).

BARABOO, city and county-seat of Sauk co., Wis.; on the Baraboo river and the Chicago and Northwestern railroad; 40 miles N. W. of Madison. It is in an agricultural region; has important manufacturing interests, which are promoted by an excellent water power; is a noted fruit center; and has National bank, daily, weekly, and monthly periodicals. Pop. (1910) 6,324; (1920) 5,538.

BAR ASSOCIATION, AMERICAN, an organization formed for the purpose of advancing the science of jurisprudence, promoting the administration of justice, securing uniformity of legislation, and upholding the honor of the legal profession. The National association has affiliated associations in most of the States. Meetings are held annually in which jurists and lawyers present subjects relating to the purposes of the association. There are about 11,000 active and 15 honorary members. The State Bar Associations number 38.

BARATARIA BAY, in the S. E. part of Louisiana, extending N. from the Gulf of Mexico, between the parishes of Jefferson and Plaquemine. This bay is about 15 miles long by 6 wide. It and the lagoons branching out of it were rendered notorious about the years 1810-1814 as being both the headquarters and rendezvous of the celebrated Lafitte and his buccaneers.

BARBACAN, or **BARBICAN**, a projecting watch tower, or other advanced work, before the gate of a castle or fortified town. The term barbacan was more especially applied to the outwork intended to defend the drawbridge, which in modern fortifications is called the *tête du pont* or bridge head.

BARBACENA, a flourishing town of Brazil, in the state of Minas Geraes, 125 miles N. W. of Rio de Janeiro. It is situated in the Mantiqueira Mountains, about 3,500 feet above the sea. Pop. about 6,000.

BARBADOES, or **BARBADOS**, the most eastern of the West Indian Islands, first mentioned in 1518, and occupied by the British in 1625; length, 21 miles; breadth, 13; area, 166 square miles; mostly under cultivation. It is divided into 11 Church of England parishes; capital, Bridgetown. (Pop. about 17,000.) It is more densely peopled than almost any spot in the world. Pop. (1918) about 190,000. This is about 1,145 to the square mile. The climate is hot, though moderated by the constant trade winds; and the island is subject to very severe hurricanes. There are few indigenous mammals or birds. The black lowland soil gives great returns of sugar in favorable seasons. The chief exports, besides sugar, are molasses and rum; imports: rice, salt meat, corn, butter, flour, textiles, etc. The imports in 1918-1919 were valued at almost

£3,000,000, the exports at almost £2,500,000. Barbadoes has a considerable transit trade, being in some measure the central mart for all the Windward Islands. It is the see of a bishop and the headquarters of the British forces in the West Indies. There is a railway across the island, also tramways, telephones, etc. The island forms a distinct government under a governor, an executive and a legislative council (9 appointed members), and a house of assembly (24 elected members).

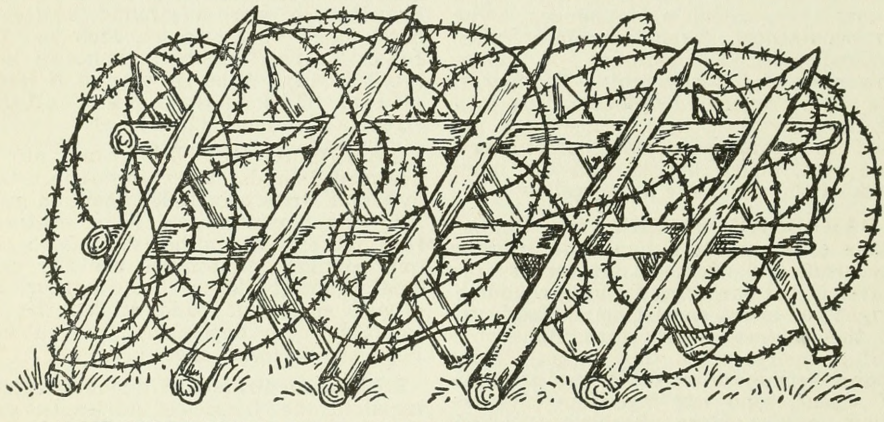
BARBAROSSA. See FREDERICK I., EMPEROR OF THE HOLY ROMAN EMPIRE.

BARBARY, a general name for the most northerly portion of Africa, extending about 2,600 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 1,550 miles; comprising Morocco, Fez, Algeria, Tunis, and Tripoli (including Barca and Fezzan). The principal races are the Berbers, the original inhabitants, from whom the country takes its name; the Arabs, who conquered an extensive portion of it during the times of the caliphs; the Bedouins, Jews, Turks, negroes, and the French colonists of Algeria, etc. The country, which was prosperous under the Carthaginians, was, next to Egypt, the richest of the Roman provinces, and the Italian states enriched themselves by their intercourse with it. In the 15th century, however, it became infested with adventurers who made the name of Barbary corsair a terror to commerce, a condition of things finally removed by the French occupation of Algeria. In the early part of the 19th century the United States Government found itself forced as a result of the attitude of some of the Barbary countries to make war against them.

BARBAULD, ANNA LÆTITIA, an English poet and essayist, born in 1743. In 1774 she married the Rev. Rochemont Barbauld. Her first poems (1773) went through four editions in one year. She wrote "Early Lessons for Children" (about 1774); "Devotional Pieces" (1775); "Hymns in Prose for Children" (1776), translated in many languages; "Eighteen Hundred and Eleven," her longest effort (1811); and prepared an edition of the best English novels in 50 volumes. She died March 9, 1825.

BARBED WIRE. See WIRE.

BARBED WIRE ENTANGLEMENTS. Protection placed in front of a military position to check an enemy assault. In the World War these were used to an unprecedented extent, owing to the prevalence of trench warfare. Great ingenuity was displayed in making these as impregnable as possible. Often they were wound around posts or stakes, projecting at an angle so as to form an abatis. At other times they were wound from bush to bush and tree to tree, every natural obstacle being availed of to strengthen the defense. Before an assault upon a trench thus defended could be made with any chance of success, an intensive and long continued artillery fire was necessary to cut lanes through the wires for the passage of the assaulting troops. Sometimes electric currents were run through the wires by the defenders, as a further strengthening of their position. The situation was not met until the invention of the tanks. These great monsters could not be deterred from crushing their way through the entanglements, while the attacking troops followed in their wake. After the Somme battle, where the tanks first demonstrated their value, they were al-



BARBED WIRE DEFENSE THAT CAN BE MOVED FROM PLACE TO PLACE

ways put in the van of the drive projected by the Allies, and entanglements, however strong, could not succeed in stopping them.

BARBERINI, a celebrated Florentine family, which, since the pontificate of Maffeo Barberini (Urban VIII., 1623 to 1644), has occupied a distinguished place among the nobility of Rome. During his reign he seemed chiefly intent on the aggrandizement of his three nephews, of whom two were appointed cardinals, and the third Prince of Palestrina. The Barberini Palace in Rome contains a famous picture gallery.

BARBERRY, or **BERBERRY**, the English name of the berberis, a genus of plants constituting the typical one of the order *berberidaceæ* (*berberids*). The common barberry (*barberis vulgaris*) is planted in gardens or in hedges, being an ornamental shrub, especially when covered with a profusion of yellow flowers or loaded with fruit. The flowers are much frequented by bees. The juice of the berries is acid, hence they are used for preserves and confectionery. The root, boiled in lye, and the inner bark of the stem, dye a fine yellow.

BARBERRY BLIGHT, the English name of a minute fungal, the *æcidium berberidis* of Persoon. It occurs on leaves of the barberry, forming roundish, bright red spots, consisting of the fruits of the *æcidium*, which form little cups full of spores when they burst. These spores germinate on the leaves or stems of wheat, send out mycelium into the plant, and produce the disease called rust.

BARBERTON, a mining town of the province of Transvaal Union of South Africa, in the De Kaap gold fields. It is situated at the base of a high range of hills 2,500 feet above sea-level, 180 miles E. of Pretoria, and 100 N. W. of Delagoa Bay, with both of which it is connected by railway. In 1886-1887, owing to the discovery of rich gold reefs, there was a rush to the place, and the population soon rose to 8,000 or more; but the superior attraction of the Witwatersrand reefs and the growth of Johannesburg reduced Barberton to a subordinate place. Pop. about 3,000.

BARBERTON, a city of Ohio, in Summit co. It is on the Baltimore and Ohio, the Erie, the Northern Ohio, and the Pennsylvania railroads, and on the Ohio canal. It has important industries, including the manufacture of matches, chemicals, sewer pipes, rubber, paint, etc. Pop. (1910) 9,410; (1920) 18,811.

BARBIZON (bär-bē-zôn'), a village on the outskirts of the forest of Fontainebleau, a great artists' resort, the home of Millet; Corot, Diaz, Daubigny, Dupré, Troyon, and Rousseau were also of the "Barbizon school" of painters. They were really not a "school," but simply a group of painters of animal, landscape, and peasant subjects having similar aims and painting in accordance with similar principles: a close study of nature, an individual expression of the painter's mood of sentiment. They belonged to the Romantic school of painting.

BARBOUR, RALPH HENRY, an American writer, born in Cambridge, Mass., in 1870. He received an academic education and began early in life to contribute to periodicals and magazines under the pen name of Richard Stillman Powell. He was a prolific writer of boys' story books, which include "The Junior Trophy" (1908); "Benton's Venture" (1914); "The Brother of a Hero" (1914); "The Lucky Seventh (1915); "Hearts Content" (1915); etc.

BARBUDA (bar-bō'da), one of the Leeward Islands, West Indies, annexed by Great Britain in 1628; about 15 miles long and 8 wide; lying N. of Antigua. It is flat, fertile, and healthy. Corn, cotton, pepper, and tobacco are the principal produce. There is no harbor, but a well sheltered roadstead on the W. side. It is a dependency of Antigua. Pop. about 1,000, mostly colored.

BARCA, or **BENGAZI**, a country extending along the N. coast of Africa, between the Great Syrtis (now called the Gulf of Sidra) and Egypt. Bounded on the W. by Tripoli, and on the S. by the Libyan Desert, it is separated from Egypt on the E. by no definite line. It nearly corresponds with the ancient Cyrenaica; and a great part of it is a high plateau. The climate is healthful and agreeable in the more elevated parts, which reach a height of almost 2,000 feet. Rice, dates, olives, and saffron flourish; the horses are celebrated as in ancient times. But the good soil extends over only about a fourth of Barca. Many ruins in the N. W. parts attest its high state of cultivation in ancient times, when its five prosperous cities bore the title of the Libyan Pentapolis. As early as the time of Cyrus, Barca became a state, which proved dangerous to the neighboring state of Cyrene; but within a single century it sank, and became subject to Egypt. In the Roman period, its inhabitants were noted for their predatory excursions. It was afterward a province of the Greek Empire, and had declared

itself independent when the Arabs invaded it and conquered it in 641. The present inhabitants consist of Arabs and Berbers. Its area is about 20,000 square miles; and the population is estimated at 325,000. The capital is Bengazi (pop. about 35,000), by which name the province is sometimes known. By the treaty of Ouchy (Oct. 12, 1912) between Italy and Turkey, Barca became an Italian dependency, and is now one of the two districts of LYBIA (*q. v.*).

BARCELONA, the most important manufacturing city in Spain, in the province of the same name; pop. about 625,000. The province of Barcelona has an area of 2,968 square miles, pop. about 1,195,000. The streets of the old town, forming the N. W. division, are crooked, narrow, and ill paved. Those of the new are much more spacious and regular. There is a large suburb E. of the town where the seafaring portion of the population chiefly reside. Barcelona is the see of a bishop. It has a university, and colleges and schools, the finest theater in Spain, a magnificent cathedral, which, begun in 1298, is not yet completed, and many other beautiful public and private buildings. Barcelona manufactures silk, woolens, cottons, lace, hats, firearms, etc., which form its principal exports. Next to Bilbao it is the most important port in Spain. Barcelona is a place of great antiquity, and associated with many historical events. Local tradition fixes the date of its foundation 400 years before the Romans; and it is said to have been refounded by Hamilcar Barca, the father of Hannibal, from whom its ancient name, Barcino, was derived. An important city under the Romans, Goths, and Moors, Barcelona in 878 became an independent sovereignty, under a Christian chief of its own, whose descendants continued to govern it, and to hold the title of Count of Barcelona, until the 12th century, when its ruler adopted the title of King of Aragon, to which kingdom it was annexed. During the Middle Ages, Barcelona became a flourishing seaport, rivaled in the Mediterranean by Genoa only. In recent times Barcelona has become the center of Spanish radicalism.

BARCELONA, formerly called New Barcelona, capital of the state of Anzoategui, Venezuela, near the mouth of the Neveri, 160 miles E. of Caracas. The surrounding country is fertile, but Barcelona is very unhealthy. Cattle, jerked beef, hides, indigo, cotton, and cacao are the chief exports. There are coal and salt mines in the vicinity. Pop. about 15,000. The town was founded in 1638 at the foot of the Cerro Santo, but was removed to its present location in 1671.

BARCOCHBA, or **BARCOKECAS** ("son of a star"), a famous Jewish impostor, whose real name was Simeon, and who lived in the 2d century A. D. After the destruction of Jerusalem by Titus, the Jews, at different periods, sought to regain their independence; and Barcochba, seeing his countrymen still impatient of the Roman yoke, resolved to attempt their emancipation. With this view he sought to sound the dispositions of his co-religionists of Egypt, Mesopotamia, Greece, Italy and Gaul, and sent forth emissaries, who traveled over all the provinces of the Roman Empire. When all was ready Barcochba solemnly announced himself as King and Messiah, and seized by surprise on many fortified places. All who refused to submit to him, particularly the Christians, were put to death. Great numbers of Jews, from all parts of the world, hastened to join his standard; and so formidable did this revolt become that Julius Severus, general of the armies of the Emperor Adrian, was compelled to act with extreme caution, and to content himself with surprising detached bodies of the enemy. Soon, however, the superior discipline of the Romans prevailed. The Jewish army, shut up in the fortress of Bethar, succumbed under fatigue and famine; Barcochba perished miserably, and all his followers were massacred or reduced to slavery. From this period may be dated the entire dispersion of the race of Israel over the face of the earth.

BARD, a fortress and village in the Italian province of Turin, on the left bank of the Dora Baltea, about 23 miles S. E. of Aosta. When the French crossed the St. Bernard, in 1800, the fortress of Bard, manned by 400 Austrians, maintained for 10 days a resistance to their further advance into Italy. Ultimately Napoleon contrived to elude the vigilance of the garrison, and passed by a mountain-track during the night. Bard was taken a short time after by the French, and razed, but, in 1825, it was restored.

BAREBONE'S PARLIAMENT, the "Little Parliament" summoned by Oliver Cromwell, met July 4, 1653, so nicknamed from the name of one of its members. It consisted of 139 persons, "faithful, fearing God, and hating covetousness." They began by abolishing the Court of Chancery, and were proceeding to abolish tithes, when Cromwell dissolved the Parliament on Dec. 12 of the same year.

BARÈGES, a watering-place, S. of France, department of Hautes-Pyrénées, about 4,000 feet above the sea, celebrated for its thermal springs, which are frequented for rheumatism, scrofula, etc.

BAREILLY (ba-rāl'ē), a town of Hindustan in the United Provinces, capital of a district of the same name, on a pleasant and elevated site. It has a fort and cantonments, a government college, and manufactures sword-cutlery, gold and silver lace, perfumery, furniture and upholstery. On the outbreak of the Indian Mutiny the native garrison took possession of the place, but it was retaken by Lord Clyde in May, 1858. Pop. about 130,000.

BARFLEUR, a seaport town of France, in the department of La Manche, about 15 miles E. of Cherbourg. It is noteworthy in history as the port whence, in 1066, William the Conqueror set out on his invasion of England. Close by, on the ill-famed "Pointe de Barfleur," stands the highest lighthouse in France, 271 feet above the sea. Pop. about 1,250.

BARHAM, RICHARD HARRIS, an English poet, born in Canterbury, Dec. 6, 1788; was educated at St. Paul's and Oxford; took orders in 1813; was rector of two country churches, and later of one in London. Under the name of THOMAS INGOLDSBY he wrote the "Ingoldsby Legends," prose and verse (London, 1840-1847), which are now classics. He also wrote "My Cousin Nicholas," a novel (1841), and "Life of Theodore Hook" (1849). He died in London, June 17, 1845.

BAR HARBOR, a popular summer resort in Hancock co., Me.; on the E. shore of Mt. Desert Island, and opposite Porcupine Islands. It derives its name from a sandy bar which connects Mt. Desert with the largest of the Porcupine group. The village is known locally as East Eden. The surrounding scenery is very pleasing, and within a short distance are many points of interest readily accessible to the tourist. Among these are the summit of Green Mountain, Eagle Lake, Mt. Newport, Kebo, The Ovens, Great and Schooner Heads, Spouting Horn, Thunder Cave, and Eagle Cliff.

BARI, ancient **BARIUM**, a seaport of southern Italy, on a small promontory of the Adriatic, capital of the province of Bari delle Puglie. It was an important place as early as the 3d century B. C., and has been thrice destroyed and rebuilt. The present town has a large Norman castle, a fine cathedral, and priory, etc. It manufactures cotton and linen goods, hats, soap, glass, and liquors; has a trade in wine, grain, almonds, oil, etc., and is now an important seaport. Pop. about 115,000. The province has an area of 2,048 square miles, and is fertile in fruit, wine, oil, etc. Pop. about 950,000.

BARING, family name of the founders of one of the greatest financial and commercial houses in the world; now known as Baring Brothers & Co. The father of the founders was JOHN BARING, a German cloth manufacturer, who started a small business at Larkbear, near Exeter, England, in the first half of the 18th century. Two of his sons, FRANCIS and JOHN (1730-1816), established in London in 1770 the now existing house.

BARING-GOULD, SABINE, an English antiquary and novelist, born in Exeter, Jan. 28, 1834. He graduated from Cambridge in 1856, and from 1881 was rector of Lew-Trenchard in Devon. He is author of "Iceland: Its Scenes and Sagas" (1864); "The Book of Werewolves" (1865); "Curious Myths of the Middle Ages" (series 1 and 2, 1866-1867); "Lives of the Saints" (1872-1879); "Yorkshire Oddities" (2 vols., 1874); and "Germany, Past and Present" (2 vols., 1879). He has also written religious books and novels which have become popular. They include "Mehalah: a Story of the Salt Marshes" (2 vols., 1880); "John Herring" (2 vols., 1883); "Red Spider" (1887); "The Broom Squire" (1896); "Bladys" (1897); "Domitia" (1898); "Pabo the Priest" (1899); "A Book of the West" (1899); "Furze-Bloom" (1899), etc. He died June 4, 1906.

BARING ISLAND, an island, also a strait and bay of the same name, in the Arctic Archipelago. They were named for Sir Francis Baring, who was First Lord of the Admiralty at the time of their discovery.

BARITE, or **BARYTE**, $BaSO_4$, a mineral, called also baroselenite, sulphate of baryta, heavy spar, and by the Derbyshire miners, cauk, calk, or cawk. It is placed by Dana in his celestite group. It is orthorhombic, and has usually tabular crystals, or is globular, fibrous, lamellar, or granular. Its color is white, yellowish, grayish, black, reddish, or dark brown. It is sometimes transparent, sometimes almost opaque. When rubbed, it is occasionally fetid. Its composition is: Sulphuric acid, 34.3; baryta (monoxide of barium), 65.7=100, hence the name sulphate of baryta. It is found as part of the gangue of metallic ores in veins in secondary limestone, etc. It

is found in the United States and on the continent of Europe.

BARIUM, a dyad metallic element; symbol Ba; atomic weight, 137. Barium is prepared by the decomposition of barium chloride, $BaCl_2$, by the electric current, or by the vapor of potassium. It is a white, malleable metal, which melts at red heat, decomposes water, and oxidizes in the air. Barium occurs in nature as barium carbonite and sulphate. Its salts are prepared by dissolving the carbonate in acids, or by roasting the native sulphate of barium with one-third its weight of coal, which converts it into barium sulphide, BaS; this is decomposed by hydrochloric or nitric acid, according as a chloride or nitrate of barium is required. All soluble salts of barium are very poisonous; the best antidotes are alkaline sulphates. The salts of barium are employed as re-agents in the laboratory, and in the manufacture of fireworks, to produce a green light.

BARK, the exterior covering of the stems of exogenous plants. It is composed of cellular and vascular tissue, is separable from the wood, and is often regarded as consisting of four layers: (1) The epidermis, or cuticle, which, however, is scarcely regarded as a part of the true bark; (2) the *epiphlœum*, or outer cellular layer of the true bark or cortex; (3) the *mesophlœum*, or middle layer, also cellular; (4) an inner vascular layer, the *liber*, or *endophlœum*, commonly called bast. Endogenous plants have no true bark. Bark contains many valuable products, as gum, tannin, etc.

BARK, PERUVIAN, is the bark of various species of trees of the genus *cinchona*, found in many parts of South America, but more particularly in Peru. Its medicinal properties depend upon the presence of quinine, which is now extracted from the bark, and prescribed.

BARKER, ELSA, an American writer, born in Leicester, Vt. She was educated privately, and for several years acted as teacher and newspaper writer. In 1904 and 1905 she was lecturer for the New York Board of Education. Her books include "The Son of Mary Bethel" (1907); "The Frozen Grail and Other Poems" (1910); "War Letters from a Living Dead Man" (1914); "Songs of a Vagrom Angel" (1916). She also wrote several plays. She was a frequent contributor of poetry and prose to magazines.

BARKER, FORDYCE, an American physician, born in Wilton, Franklin co., Me., May 2, 1819. Completing courses at Bowdoin, Harvard, and in Europe, he entered upon the practice of his profession in Norwich in 1845. He made a specialty of obstetrics and diseases of women. After serving as Professor of Midwifery at Bowdoin, he removed to New York City in 1850. He was an incorporator of the New York Medical College and obstetrical surgeon to Bellevue Hospital. He wrote "Puerperal Diseases" and "On Seasickness." He died in New York City, May 30, 1891.

BARKER (HARLEY) GRANVILLE, an English actor and playwright, born in 1877. He began his career as an actor, but soon became manager of the Court Theater in London. His first successes were made in several of Bernard Shaw's plays. He was better known as a playwright than as an actor. The revolutionary and realistic movement in the drama early attracted him and he became one of its chief exponents. He produced a number of plays in which prominence was given to social problems. He developed a high technical skill in writing these plays which were produced with great success in England and in the United States. Some of his best known works were "The Marrying of Ann Leet" (1901); "Waste" (1907); "Prunella" 1913).

BARKER, WHARTON, an American financier and publicist, born in Philadelphia in 1846. He graduated from the University of Pennsylvania in 1866 and afterward took post-graduate courses at that institution. He became a member of the banking firm of Barker Bros. and Co., and in 1887 was appointed special financial agent in the United States of the Russian Government. In 1887 he was in Russia as adviser of the Russian Government on the development of coal and iron mines, and later spent some time in China in an advisory capacity. He founded the Investment Co. of Philadelphia and he founded also the "Penn Monthly," which was merged in 1880 into "The American," of which he was publisher from 1880 to 1890. He was chief organizer of the opposition to a third term of General Grant and proposed Garfield for president. He was active in Republican politics until 1896, when he became a Populist and was anti-fusion Populist nominee for president in 1900. He was the leading advocate of a commercial union of all American nations. He opposed the annexation of the Philippines and urged the independence of the islands. From 1880 he was a trustee of the University of Pennsylvania. He was a member of many economic societies, and was a frequent contributor to magazines on economic subjects.

BAR-LE-DUC, a city in France, the capital of the department of Meuse. It is on the Ornain river and the Marne canal, about 160 miles E. of Paris. Among other notable buildings are a 15th century church, the city hall, a commercial museum, a library, and theater. The city suffered severely during the World War. Prior to that time it had important manufactures, including cotton and woolen mills, breweries, paper mills, foundries, etc. Pop. about 20,000.

BARLEY, seeds or grains of various species and varieties of the genus *hordeum*. That most commonly in cultivation is *hordeum vulgare*, spring, or two-rowed barley, especially the rathripe and thanet sorts. *H. hexastichon* (*i. e.*, with the seeds growing in six rows) is the bear, or bigg barley. *H. distichon*, two-rowed, or common barley, is preferred for malting, which is one of the chief purposes for which barley is cultivated. *H. zeocriton*, or sprat-barley, is more rare. Barley is the hardiest of all the cereals, and was originally a native of Asia, but it is now cultivated all over the world, even as far N. as Lapland. In ancient times, it was largely used as an article of food, but the greater proportion now grown is used in the preparation of malt and spirits. For culinary purposes, it is sold in two forms, Scotch or pot barley, and pearl barley, the former partially deprived of its husk; the latter, with all the husk removed.

Bread made from barley meal is darker in color and less nutritious than that made from wheat flour.

BARLOW, FRANCIS CHANNING, an American military officer, born in Brooklyn, N. Y., Oct. 9, 1834; graduated from Harvard College in 1855; studied law in New York, and practiced there. In 1861 he enlisted as a private in the 12th Regiment, New York State National Guard. He was promoted Lieutenant after three months of service; Colonel during the siege of Yorktown; distinguished himself in the battle of Fair Oaks, or Seven Pines, for which he was promoted Brigadier-General; fought in almost every subsequent battle of the Army of the Potomac. He was severely wounded at Chancellorsville, May 2, 1863, and at Gettysburg, July 1, 1863. He was mustered out of the service with the rank of Major-General of volunteers. In 1860-1868, he was Secretary of State of New York; in 1871 became Attorney-General; and in 1873 resumed law practice in New York. He died in New York City, Jan. 11, 1896.

BARLOW, JANE, an Irish poet and story writer, born in County Dublin about 1857. Her popular books include "Irish Idylls" (1892); "Bogland Studies," "Kerrigan's Quality," "Walled Out, or Eschatology in a Bog," "The Mockers of the Shallow Waters" (1893); "Strangers at Lisconnel" (1895); "Irish Ways" (1911); "Flaws" (1912); etc. She died in 1917.

BARLOW, JOEL, an American poet and statesman, born in Reading, Conn., March 24, 1754; published political works and poems, which contain many philosophical and political dissertations. "The Vision of Columbus" (1787) was extended into "The Columbiad," a long epic (1807). He also wrote "The Conspiracy of Kings" (1792), and the celebrated poem, "Hasty Pudding." He died near Cracow, Poland, Dec. 24, 1812, while on his way to meet Napoleon I. in his capacity as commissioner to the French Emperor.

BARLOW, PETER, an English physicist and mathematician, born at Norwich in 1776. He was Professor of Mathematics in the Royal Military Academy at Woolwich for a period of 40 years. In 1823, he was elected a Fellow of the Royal Society, and in 1825 received from it the Copley medal for his researches in magnetism. In 1829, he was admitted a member of the French Institute. His greatest work is the "Mathematical and Philosophical Dictionary." He was also the author of "Machinery and Manufactures of Great Britain" (1837); "Force and Rapidity of Locomotives" (1838); and "Essay and Magnetic Attraction," one of the first works in which the phenomena of magnetism were distinctly enunciated. He died in 1862.

BARMECIDES, an illustrious family of Khorassan, the romance of whose history is equally familiar to Europeans and Americans in the "Arabian Nights Entertainments," and to Orientals in the pages of their historians and poets; and who flourished at the Court of the early Abbasside Caliphs. Barmec, or Barmek, the founder of the family, transmitted the honors conferred on him by the Caliph Abd-al-Malik to his son, Khalid, and from him they passed to his son, Yahia, who, becoming tutor to the famous Haroun-al-Raschid, acquired an influence over that Prince, which carried his sons, Fadl, or Fazl, Giaffar, Mohammed, and Mousa, to the highest dignities of the Court. The virtues and munificence of the Barmecides were, for a long period, displayed under favor of Haroun;

but one of the brothers, Giaffar, having at last become an object of suspicion to the Caliph, Yahia and his sons were suddenly seized, Giaffar beheaded, and the others condemned to perpetual imprisonment. The year 802 is assigned as the date of this tragedy.

BARMEN, a city on the Wupper, in the Prussian Rhine province, government of Düsseldorf, and formed by the union of seven villages contained in the fine valley of Barmen. It has extensive ribbon and other textile manufactures; also dye works, manufactures of chemicals, metal wares, buttons, yarns, iron, machines, pianos, organs, soap, etc. Pop. about 175,000.

BARNABAS, ST., or **JOSEPH**, a disciple of Jesus, and a companion of the Apostle Paul. He was a Levite, and a native of the island of Cyprus, and is said to have sold all his property, and laid the price of it at the feet of the apostles (Acts iv: 36, 37). When Paul came to Jerusalem, three years after his conversion, about A. D. 38, Barnabas introduced him to the other apostles (Acts ix: 26, 27). Five years afterward, the Church at Jerusalem being informed of the progress of the Gospel at Antioch, sent Barnabas thither. (Acts xi: 20, 24). He afterward went to Tarsus, to seek Paul and bring him to Antioch, where they dwelt together two years, and great numbers were converted. They left Antioch A. D. 45, to convey alms from this Church to that of Jerusalem, and soon returned, bringing with them John Mark (Acts xi: 28, 30; xii: 25). While they were at Antioch, the Holy Ghost directed that they should be set apart for those labors to which he had appointed them; viz., the planting of new churches among the Gentiles. They then visited Cyprus, and some cities of Asia Minor (Acts xv: 2-14), and after three years' absence returned to Antioch. In A. D. 50, he and Paul were appointed delegates from the Syrian churches to consult the apostles and elders at Jerusalem, respecting certain questions raised by Jewish zealots; and they returned after having obtained the judgment of the brethren of Jerusalem. While preparing for a second missionary tour, Paul and Barnabas, having a dispute relative to Mark, Barnabas' nephew, they separated, Paul going to Asia, and Barnabas with Mark to Cyprus (Acts xiv: 36-41; Gal. ii: 13). Nothing is known of his subsequent history. The festival of St. Barnabas is celebrated in the Roman Catholic Church on the 11th of June.

EPISTLE OF ST. BARNABAS, an apocryphal letter laying greater claim to canonical authority than most of the other uncredited writings. It is published by Archbishop Wake among his translations of the works of the Apostolical Fathers, in the preliminary dissertation to which he gives the arguments adduced to prove it to be the work of St. Barnabas. It is, however, generally believed to have been written by some converted Jew in the 2d century, and seems to have been addressed to the unconverted Jews. It is divided into two parts.

GOSPEL OF ST. BARNABAS, the apocryphal work also ascribed to Barnabas. It relates the history of Christ very differently from the Evangelists, and is believed to be a forgery of some nominal Christians, and afterward altered and interpolated by the Mohammedans, the better to serve their purpose. It corresponds with those traditions which Mohammed followed in the Koran.

BARNABAS, CAPE, a headland of Alaska, which Cook discovered on St. Barnabas Day.

BARNACLE, in zoölogy, (1) A general name for both pedunculated and sessile cirripeds. (2) Special: The English name of the pedunculated cirripeds (*lepadidæ*), as contradistinguished from those which are sessile, yet more especially applied to the *lepas*, the typical genus of the family and order.

In ornithology the name for the barnacle goose. Formerly the absurb belief was entertained that these geese sprung from the barnacles described above. Two species of the genus *lepas* were called, by Linnæus, *lepas anserifera* and *L. anatifera* = goose-bearing, of course with no belief in the fable suggested by the name.

BARNARD, EDWARD EMERSON, an American astronomer, born in Nashville, Tenn., Dec. 16, 1857; graduated at Vanderbilt University in 1887; was astronomer in Lick Observatory, California, in 1887-1895, and then became Professor of Astronomy in Chicago University and Director of the Yerkes Observatory. His principal discoveries are the fifth satellite of Jupiter in 1892, and 16 comets. He has made photographs of the Milky Way, the comets, nebulæ, etc. The French Academy of Sciences awarded him the Lelande gold medal in 1892, the Arago gold medal in 1893, the Janssen gold medal in 1900, and the Janssen prize in 1906, and the Royal Astronomical Society of Great Britain gave him a gold medal in 1897. He is a member of many American and foreign societies, and a contributor to astronomical journals.

BARNARD, FREDERICK AUGUSTUS PORTER, an American educator, born in Sheffield, Mass., May 5, 1809; was graduated at Yale College in 1828; instructor there in 1830; Professor of Mathematics and Natural Philosophy in the University of Alabama in 1837-1848, and afterward of Chemistry and Natural History till 1854; Professor of Mathematics and Astronomy in the University of Mississippi, 1854-1861; its president in 1856-1858; and its Chancellor in 1858-1861. He was president of Columbia College, New York City, in 1864-1888. In 1860 he was appointed a member of the expedition to observe the eclipse of the sun in Labrador; was engaged in 1862 in reducing observations of the stars in the Southern Hemisphere; had charge of the publication of charts and maps of the United States Coast Survey in 1863; was named one of the original incorporators of the National Academy of Sciences in 1863; was one of the United States commissioners to the Paris Exposition in 1867, member of the American Philosophical Society, corresponding member of the Royal Society of Liege, and member of many other scientific and literary associations. Among his publications are "Letters on College Government" (1854); "Report on Collegiate Education" (1854); "Art Culture" (1854); "History of the American Coast Survey" (1857); "University Education" (1858); "Undulatory Theory of Light" (1862); "Machinery and Processes of the Industrial Arts, and Apparatus of Exact Science" (1868); "Metric System of Weights and Measures" (1871); etc. He died in New York City, April 27, 1889.

BARNARD, GEORGE GREY, an American sculptor, born in Bellefonte, Pa., in 1863. He studied art in Paris, exhibited in the Paris Salon in 1894, was awarded a gold medal in the Paris Exposition in 1900, and also received other medals for excellency in artistic work. For several years he was professor of sculpture in the Art Students' League, New York. Following the death of Augustus Saint Gaudens he was the most conspicuous of American sculptors. His best known works include sculptures for the Pennsylvania State capitol and a statue of Lincoln which, after a bitter controversy as to its fidelity and artistic merits, was presented to the city of Manchester, England, in 1920.

BARNARD-CASTLE, a town of England, county of Durham, giving name to a parliamentary division of the county. There is a large thread mill and carpet manufactories, the Bowes Museum and Art Gallery, and the Northern Counties School. The castle was originally built about 1178 by Barnard Baliol, grandfather of John Baliol.

BARNARD COLLEGE, a college for women in New York City, forming a part of COLUMBIA UNIVERSITY (*q. v.*). There were in 1919, 715 students and 86 members of the faculty. Dean, V. C. Gildersleeve, Ph. D.

BARNARDO, THOMAS JOHN, an English philanthropist; founder of the Barnardo Homes for homeless children; had his attention first turned in this direction by the condition in which he found a boy in a ragged school in East London in 1866. Following up the subject, he began to rescue children who had found their only shelter at night under archways, or in courts and alleys. These were introduced to his homes, where they received an industrial training. At the time of Dr. Barnardo's death, in 1905, over 60,000 destitute children had passed through his institutions. There were then in the United Kingdom and colonies 112 branches including an immigration depot at Ontario, and farm at Manitoba, home for babies and hospital for sick children. Thousands of "Barnardo's boys" fought with the British forces on land and sea in the European War.

BARNAVE, ANTOINE PIERRE JOSEPH MARIE (bär-näv'), a French orator, was born at Grenoble in 1761. He was the son of a rich procureur. He was chosen a Deputy of the *tiers état* to the Assembly of the States-General, and showed himself an open enemy to the court. The Constituent Assembly appointed him their President in January, 1791. After the flight of the King, and the subsequent arrest of the royal family, he was sent, with Petion and Latour-Maubourg, to conduct them to Paris. When the correspondence of the court fell into the hands of the victorious party, Aug. 10, 1792, they pretended to have found documents which showed him to have been secretly connected with it, and he was guillotined Nov. 29, 1793.

BARN BURNERS, the nickname given to the radical element of the Democratic party in New York State, which supported Van Buren in the campaign of 1848.

BARNEGAT BAY, a bay on the E. coast of New Jersey, about 25 miles in length. Barnegat Inlet connects the bay with the Atlantic.

BARNES, GEORGE NICOLL, a British statesman, born in Scotland in 1859. He entered Parliament in 1906 as

representative of the Labor party. In 1910 he was made Pensions Minister, and in 1917 became a member of the War Council. He was a delegate to the Peace Conference in Paris in 1919, and was a prominent figure in the discussion and framing of the Labor feature of the League of Nations covenant.

BARNES, JAMES, an American writer, born in Annapolis, Md., in 1866. He graduated from Princeton University in 1891, was, for several years following, a member of the editorial staff of several magazines, war correspondent in South Africa from 1889 to 1901, and literary editor of D. Appleton & Co. from 1905 to 1908. Among his many books are "Yankee Ships and Yankee Sailors" (1897); "The Son of Light Horse Harry" (1904); "The Clutch of Circumstance" (1908); "Through Central Africa from Coast to Coast" (1915); etc. During the World War he served as an aviator and for several months was head of the Princeton Aviation School. He was also head of the photographic division of the United States Army and was sent to France to organize the United States aviation photographic work.

BARNES, WILLIAM, an English poet and philologist, born in Dorsetshire, Feb. 22, 1800; wrote many books on philology; and three series of "Poems of Rural Life in the Dorsetshire Dialect" (1844, 1846 and 1863), and "Poems of Rural Life" (1866). He died in Winterbourne Came, in October, 1886.

BARNES, WILLIAM, JR., an American politician, born in 1866. He graduated from Harvard University in 1888 and became in the following year owner and editor of the "Albany Evening Journal." His influence and powerful personality made him one of the leading political figures in New York State. He was for several years practically the director of the Republican party in that State, although he at no time held office. His control continued until 1912, when he bitterly opposed the attempt to nominate Theodore Roosevelt at the Republican National Convention. Following the defeat of the Republican party in 1912 his influence lessened but was, however, gradually revived until he was active in the Republican Convention of 1920 and was one of the leading figures in the conservative element of that convention.

BARNET, a town of England, in Herts, 11 miles from London, where was fought in 1471 a battle between the Yorkists and Lancastrians, resulting in the defeat of the latter and the death of Warwick, Edward IV. being thus established on the throne.

BARNEVELDT, JAN VAN OLDEN (bär'ne-velt), Grand Pensionary of Holland, born in 1549. He had scarcely reached his 20th year when he was called to the office of Councilor and Pensionary of Rotterdam. He was allowed an important share in the management of those transactions with France and England by which the United Provinces sought to maintain themselves against Spain, whose yoke they had just thrown off. His conduct in the high office of Grand Pensionary of Holland and West Friesland, which he afterward filled, not only secured the independence, but restored the trade and improved the finances of the United Provinces. After the election of Maurice of Nassau to the dignity of Stadtholder, Barneveldt became the champion of popular liberties, and opposed the ambitious designs of the new prince. He was so far successful as to have a truce of 12 years concluded with Spain, in opposition to the views of the Stadtholder. About this time, the fanaticism of two sects, the Arminians and Gomarists, raged throughout Holland, and the Grand Pensionary was involved in the ruin of the former. After the condemnation of the Arminians by the Synod of Dort, Barneveldt was adjudged to death as a traitor and heretic, by 26 deputies named by Maurice. The sentence was carried into effect in 1619.

BARNSLEY, a city and county borough of West Riding, Yorkshire, England, on the Dearne, between Leeds and Sheffield, in the middle of a coal district. It is one of the chief centers of the linen industry and has flour and sawmills, chemical manufacturing, wire drawing and glassmaking plants and foundries. Pop. about 52,000.

BARNUM, PHINEAS TAYLOR, an American showman, born at Bethel, Conn., July 5, 1810; after various unsuccessful business ventures, finally established Barnum's Museum in New York (1841), which was twice burned. He introduced Tom Thumb, Jenny Lind, Commodore Nutt, Admiral Dot, the woolly horse, Jumbo, etc., to the American public. In 1871 he established his great circus. He was mayor of Bridgeport, and four times member of the Connecticut Legislature. His benefactions were large and frequent. He wrote "Humbugs of the World" (1865); "Struggles and Triumphs" (1869); "Lion Jack, a Story" (1876); "Autobiography" (1855). He was a lecturer on temperance and other popular subjects. He died at Bridgeport, Conn., April 7, 1891.

BAROCCO, or **BAROQUE**, a term applied to the last phase of the classic revival of the fine arts in Italy. Its general tendency was away from the classic refinement and restraint, in the direction of ostentation. Much of the work is without meaning and at times vulgar. It found its expression chiefly in architecture, where many examples still exist in Italy and throughout Europe.

BARODA, the second city of Guzerat, and third in the presidency of Bombay, India; capital of the native state of the same name. It is 248 miles N. of Bombay, has several palaces, Hindu and other temples, contains the chief court of the state, a high class school, and two vernacular schools. Baroda occupies an important situation between the coast and the interior, and its trade is considerable. Pop. about 100,000. The state has an area of 8,182 square miles and a population of over 2,000,000. The soil is fertile; ruined temples, deserted towns and tanks half filled with mud are a witness of former prosperity. In the N. division there is a famous breed of large white cattle; grain, cotton, tobacco, sugar-cane, and oil seeds are the chief agricultural products, and grow luxuriantly.

BAROMETER, an instrument used for measuring the atmospheric pressure. The most common form of barometer is what is called a cistern barometer. It consists essentially of a straight glass tube about 33 inches long, filled with mercury, and dipping into a cistern of the same metal. It is affixed to a stand, on the upper part of which is a graduated scale to mark the height in inches at which the mercury stands. When complete, a thermometer stands side by side with it to note the temperature at which the pressure of the atmosphere is tested. Gay-Lussac's barometer is in the form of a siphon. It has two scales with a common zero point, and graduated in contrary directions. As the one branch, the shorter one, corresponds to the cistern, and the other or longer one to the tube, the difference between the two levels is the true height of the mercury. A barometer is popularly termed a weather glass. In order to adapt it for this purpose Hooke devised what is called the wheel barometer. It is a siphon barometer, having in its shorter leg a float, a string from which passes over a pulley, and is connected with a weight somewhat lighter than the float. To the pulley is affixed a needle, which moves round a circle graduated to represent the different variations in the weather. Speaking broadly, a barometer rises for good and falls for bad weather, but there are exceptions to this rule.

BARON, in the feudal system of the Middle Ages, the title baron, derived from the Latin *varo*, which signifies a man, and, sometimes, a servant, was given, at first, to the immediate tenant of any superior. In old records, the citizens of London are so styled. This title was introduced by William the Conqueror into England, from Normandy, and used to signify an immediate vassal of the crown, who had a seat and vote in the royal court and tribunals, and, subsequently, in the House of Peers. It was the second rank of nobility, until dukes and marquises were introduced, and placed above the earls, and viscounts also set above the barons. In Germany, the ancient barons of the empire were the immediate vassals of the crown. They appeared in the imperial court and diet, and belonged to the high nobility. But these ancient feudatories were early elevated to the rank of counts or princes. The modern barons only form a rank of lower nobility after the counts. In England, baron is the lowest grade of rank in the House of Lords. A baron is styled right honorable, and his children enjoy the prefix of honorable. In England, too, the four puisne judges of the Court of Exchequer bear the title of baron, and the chief judge that of Lord Chief Baron of the Exchequer. Barons of the Cinque Ports: formerly members of the House of Commons, elected, two for each, by the seven Cinque Ports.

BARONET, originally a term apparently in use as early as the time of Edward III. for certain landed gentlemen not of the dignity of lords, summoned to Parliament to counterbalance the power of the clergy. Subsequently it became the name given to three titled orders.

1. Baronets of Great Britain: A titled order, the lowest that is hereditary. Speaking broadly, they rank in precedence next after the younger sons of viscounts and barons: but in reality they are inferior to the Knights of the Order of St. George or of the Garter, certain official dignitaries, and knights-banneret created on the actual field of battle. The order was instituted by James I., on May 22, 1611, to raise money by fees paid for the dignity, and thus obtain resources for the settlement of Ulster. The badge of a baronet is sinister, a hand gules (= a bloody hand) in a field of argent. Etiquette requires that he be addressed as "Sir A. B., Bart."

2. Baronets of Ireland: A titled order instituted by James I. in 1619. It is

believed that this dignity has not been conferred on any one since the union of Great Britain and Ireland in 1801.

3. Baronets of Scotland: A titled order planned by James I., but actually instituted, not by him, but by Charles I. in 1625, just after the accession of the latter monarch to the throne. The object aimed at in the creation of the order was the planting of Nova Scotia (New Scotland). Since the union between England and Scotland in 1707, no baronets have been created holding rank in the latter country alone, but some titles existing previously still figure in the British baronetage.

BARONY, the lordship or fee of a baron, either temporal or spiritual. Originally every peer of superior rank had also a barony annexed to his other titles. But now the rule is not universal. Baronies in their first creation emanated from the King. Baronies appertain also to bishops, as they formerly did to abbots, William the Conqueror having changed the spiritual tenure of frankalmoyn, or free alms, by which they held their lands under the Saxon government, to the Norman or feudal tenure by barony. It was in virtue of this that they obtained seats in the House of Lords. The word is common in Ireland for a subdivision of a country.

BAROTSE, or MAROTSE, an important Bantu tribe inhabiting the banks and the regions E. of the upper Zambezi, from about 14° to 18° S. lat. In Livingstone's time the Makololo were the dominant tribe in these parts of South Africa, but since then they have been almost entirely annihilated by the Bantus, who now occupy the vast territory from the Kabompo river to the Victoria Falls. Formerly they were inhabitants of Mashonaland, where many of them were destroyed by the Matabili, while the others retired into upper Zambezi valley.

BARR, AMELIA EDITH, an Anglo-American novelist, born in Ulverton, Lancashire, England, March 29, 1831. She was the daughter of the Rev. William Huddleston, and in 1850 married Robert Barr. She came to the United States in 1854, and lived for some years in Texas; but after her husband's death (1867) removed to New York, where her first book, "Romance and Reality," was published in 1872. Her novels were very popular. They include "Jan Vedder's Wife" (New York, 1885); "A Daughter of Fife" (1885); "A Bow of Orange Ribbon" (1886); "A Border Shepherdess" (1887); "Friend Olivia" (1890); "A Sister to Esau" (1891); "Remember the Alamo" and "Prisoners of Conscience" (1897); "I, Thou, and the Other One" (1899); "All the Days of My Life" (1912); "The Measure of Man" (1915); "Three Score Years and Ten," an Autobiography (1915); "Christine" (1917); etc. She died in 1919.

BARR, ROBERT, a Scottish author, born in Glasgow, Sept. 16, 1850; he spent his childhood in Canada, drifted into journalism, joined the staff of Detroit "Free Press," and wrote under the name of "Luke Sharp." He went to London in 1881 and founded "The Idler" with Jerome K. Jerome, but retired to devote himself to fiction. He wrote a number of novels, "In the Midst of Alarms" (1894); "The Face on the Mask" (1895); "One Day's Courtship" (1896); "A Woman Intervenes" (1896); "The Victors" (1901); "The Sword Maker" (1910); "The Palace of Logs" (1912); etc. He died in 1912.

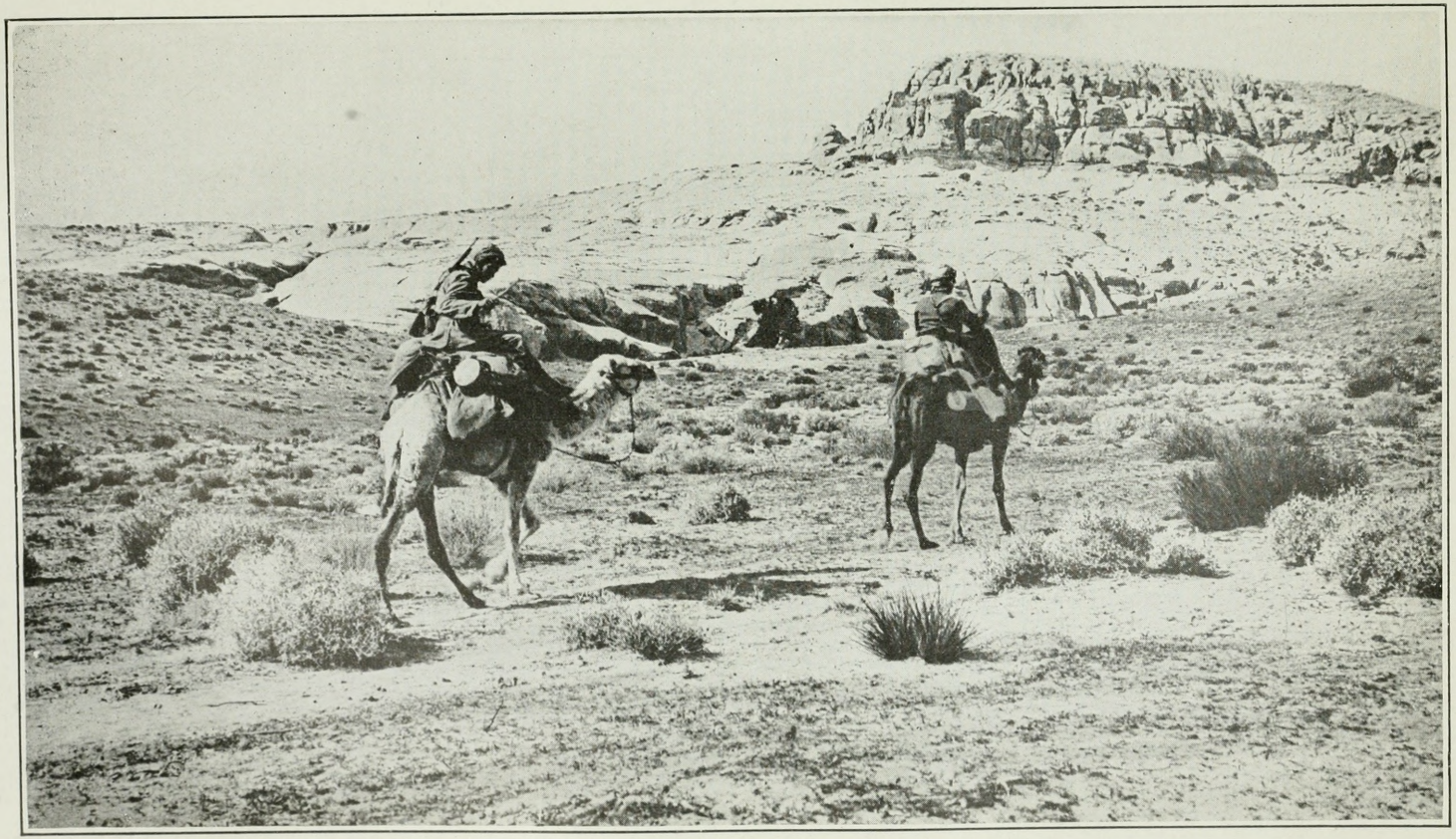
BARRA, an island of the Outer Hebrides, W. coast of Scotland, belonging to Invernessshire; 8 miles long and from 2 to 5 broad, of irregular outline, with rocky coasts, surface hilly, but furnishing excellent pasture. On the W. coast the Atlantic has hollowed out vast caves and fissures. Large herds of cattle and flocks of sheep are reared on the island. Fishing is an important industry. Pop. about 2,500.

BARRACK, a hut or small lodge. Formerly a temporary building of this character, one of many erected to shelter horsemen. Then it was extended to embrace any temporary erection for a soldier, to whatever arm of the service belonging. The plural, barracks, is now generally applied to a large structure, for the housing of troops.

BARRACKPUR, a native town, capital of a subdistrict in Bengal, on the E. bank of the Hooghly, and 15 miles up the stream from Calcutta. Two Sepoy mutinies have occurred here, the first in 1824, when a regiment of Bengal infantry refused to go for service in the Burmese War, and again in the famous mutiny of 1857. Pop. about 18,000.

BARRACUDA, a fish—the *sphyræna barracuda*—found in the vicinity of the Bahamas and other West Indian islands.

BARRAGE, a protective artillery fire laid down when troops are advancing to an assault. Intensive bombardment of a trench or other point destined for attack is first carried on, and when the defenders are supposed to be sufficiently decimated or demoralized, the signal is given for the charge. As they



ARABIAN SOLDIERS IN THE KINGDOM OF HEDJAZ



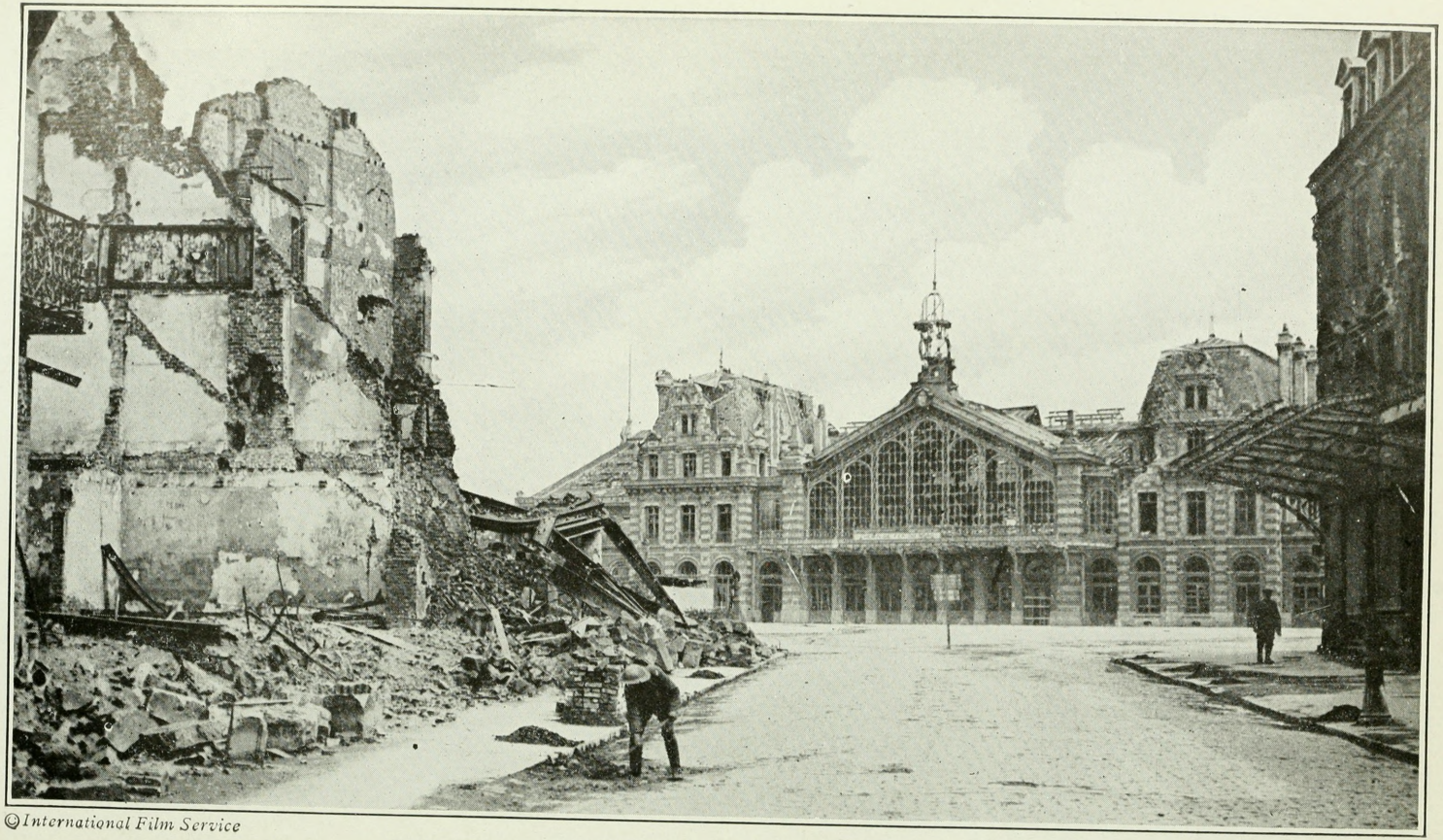
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THE CAPITOL, BUENOS AIRES, ARGENTINA



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CENTRAL AVENUE, LEADING TO THE STATE CAPITOL, LITTLE ROCK, ARK.



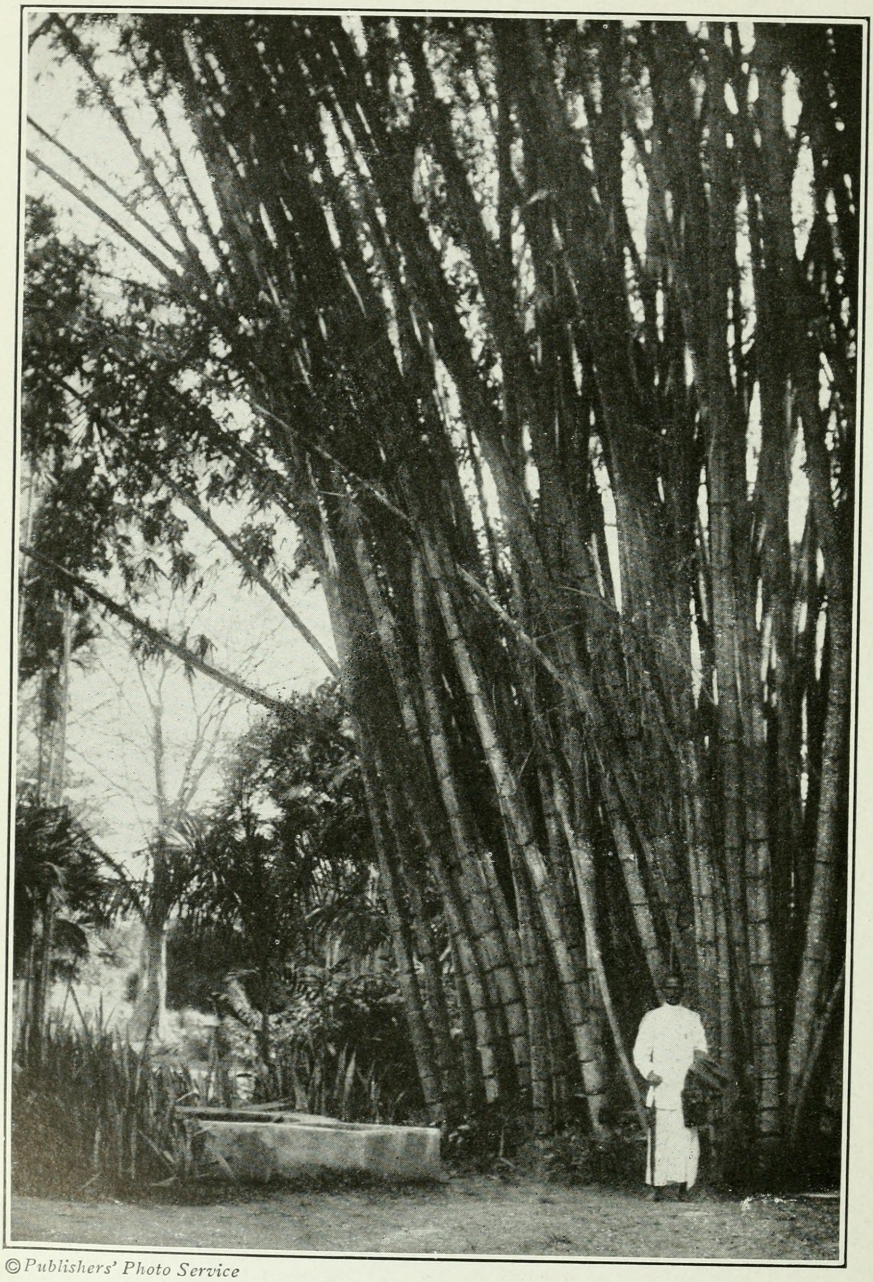
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THE RUINS OF ARRAS, FRANCE, ON THE BRITISH WAR FRONT



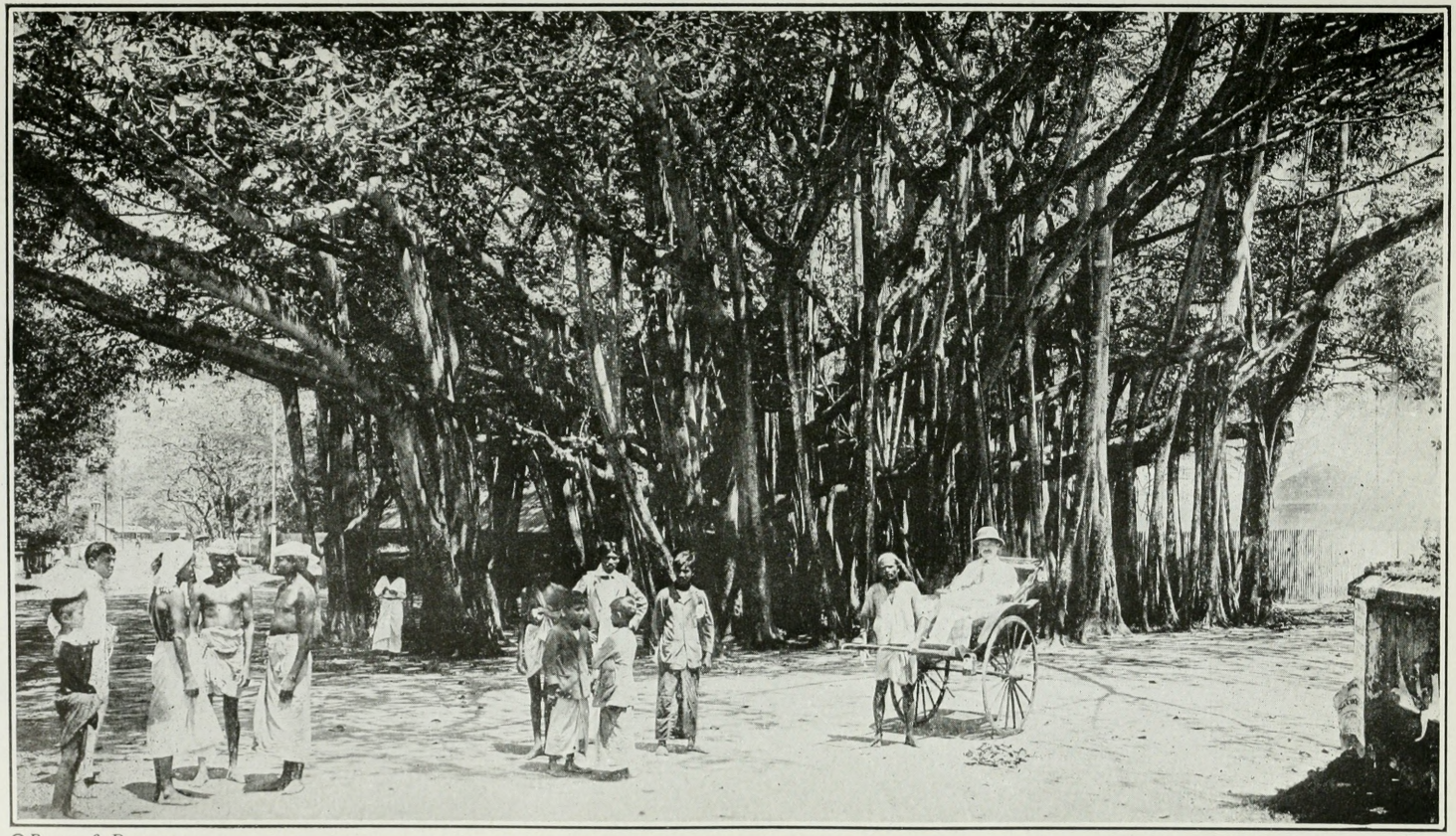
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DRILLING IN AN ASBESTOS MINE AT THEDFORD, PROVINCE OF QUEBEC, CANADA



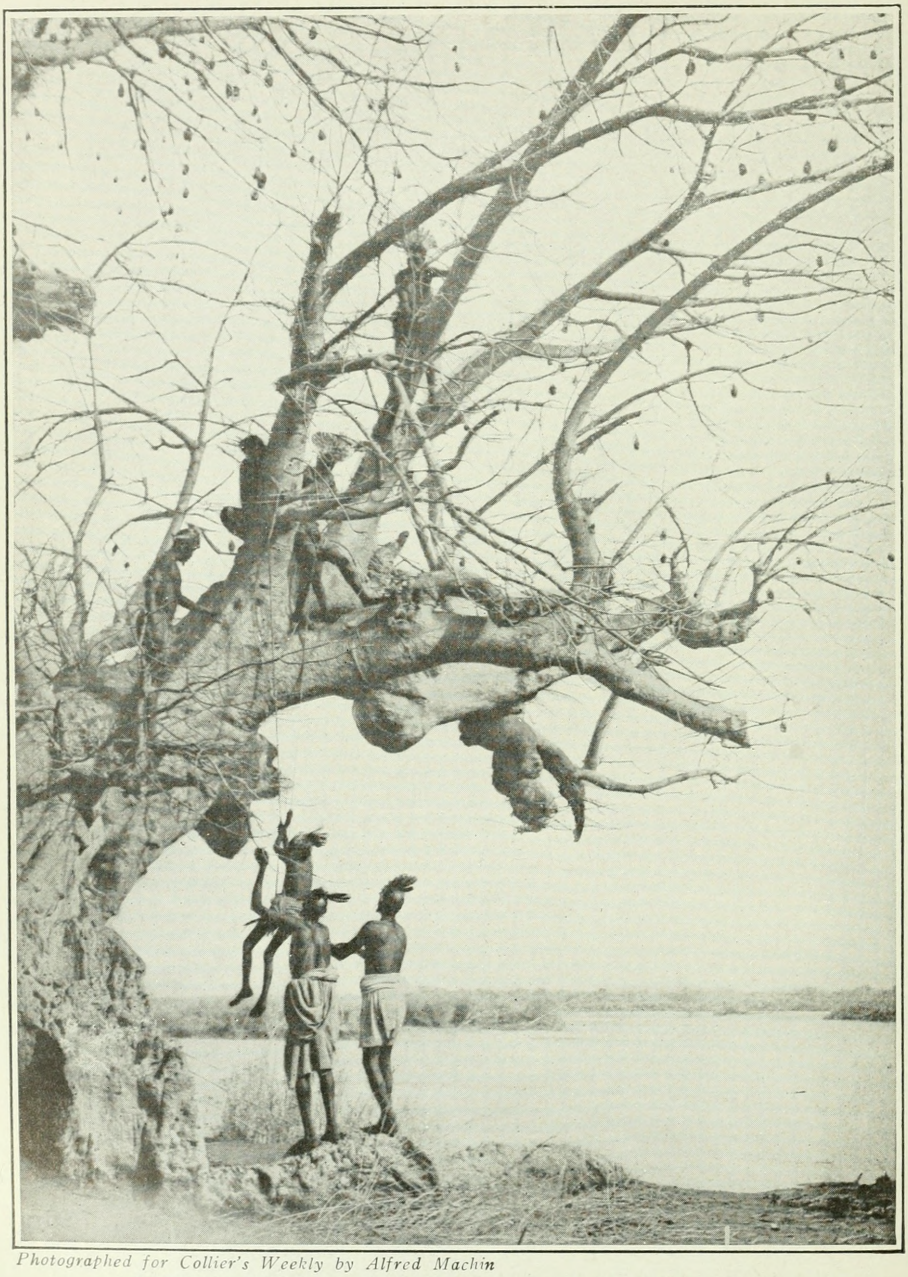
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A CLUMP OF GIANT BAMBOO IN CEYLON



©Brown & Dawson

A GREAT BANYAN TREE NEAR THE CITY OF COLOMBO, CEYLON



Photographed for Collier's Weekly by Alfred Machin

GATHERING THE FRUIT OF THE BAOBAB TREE IN THE REGION OF THE UPPER NILE

advance, a barrage is laid down by their artillery either behind the threatened position, to prevent the defenders from retreating or being re-enforced, or in front of the advancing troops, to clear their path. The barrage has to be most carefully calculated, so that the assailants themselves may not be caught in the fire destined for their foes.

BARRANQUILLA (bar-an-kē'la), the principal port of the Republic of Colombia and capital of the department of Atlantico, lies near the left bank of the main channel of the Magdalena, 15 miles distant from the sea. A railway runs to the coast; and the bar at the mouth of the river has been improved so as to enable sea-going vessels to pass up to Barranquilla, which possesses excellent wharfage accommodation. The inland traffic by river steamers is important. Pop. about 65,000.

BARRAS (bär-ä'), **PAUL FRANÇOIS JEAN NICOLAS, COMTE DE,** a French Jacobin, born in Provence, in 1755; served as second lieutenant in the regiment of Languedoc until 1775. He made a voyage to the Isle-de-France, and entered into the garrison of Pondicherry. On his return, he led a dissipated life and squandered his fortune. When the Revolution broke out he opposed the Court, had a seat in the *tiers-état*, while his brother sat with the nobility. July 14, 1789, he took part in the attack upon the Bastille, and Aug. 10, 1792, upon the Tuileries. In 1792 he was elected a member of the National Convention, and voted for the unconditional death of Louis XVI. He was sent, in 1793, to the south of France, and commanded the left wing of the besieging army under Dugommier, and it was here that he first met Napoleon Bonaparte, then captain of artillery. Robespierre was no friend of his, and often wished to arrest him. Barras, knowing this, became one of the principal actors of the 9th Thermidor, and put himself at the head of the troops which surrounded Robespierre at the Hôtel de Ville. In 1794 he was named one of the Committee of Public Safety. In February, 1795, he was elected President of the Convention, and, in that capacity, declared Paris in a state of siege, when the Assembly was attacked by the populace. Afterward, when the Convention was assailed, Bonaparte, by Barras' advice, was appointed to command the artillery; and that general, on the 13th Vendémiaire (Oct. 5, 1795), decisively repressed the royalist movement. For his services, Barras was now named one of the Directory. Napoleon's *coup d'état*, on the 18th Brumaire (Nov. 9, 1799), overthrew the power of Barras and his colleagues. He died in Paris, Jan. 29, 1829.

BARRÉ, ISAAC (bä-rā'), a British soldier, born at Dublin in 1726. Gazetted as an ensign in 1746, he became friendly with General Wolfe, under whom he rose to the rank of Lieutenant-Colonel. He was wounded at Quebec, was beside Wolfe when he fell, and figures in West's picture of "The Death of Wolfe." He entered Parliament in 1761, and held office successively under Lord Bute, Pitt, Rockingham, and Lord Shelburne. In Pitt's second administration he exposed the corruptions of the ministry, was a strong opponent of Lord North's ministry, and opposed the taxation of America. He died in London, July 20, 1802.

BARRE, a city in Washington co., Vt., on the Central Vermont and the Montpelier and Wells River railroads; 6 miles S. E. of Montpelier. Barre received a city charter in 1894; and has a wide reputation as one of the most important seats of the granite industry in the United States. The city contains, besides granite quarries, several industrial plants connected therewith; several banks; a library; opera house; Goddard Seminary; Spaulding High School; and daily and weekly newspapers. Pop. (1910) 10,734; (1920) 10,008.

BARREL, a word having many applications, including: I. Of anything shaped like a cask. (1) A cask; a vessel bulging in the middle, formed of staves surrounded by hoops, and with a bunghole to afford egress to the generally liquid contents. (2) The capacity of such a cask, supposing it to be of the normal magnitude. In one for holding liquids the capacity is usually from 30 to 45 gallons.

II. Of anything hollow and cylindrical. The metallic tube which receives the charge in a musket or rifle. With the stock and the lock, it comprises the whole instrument.

III. Of anything cylindrical, whether hollow or not. A cylinder, and especially one about which anything is wound.

Technically.—I. Measures. As much as an ordinary barrel will hold. Specially: (1) Liquid measure. In this sense the several liquids have each a different capacity of barrel. A barrel of wine is 31½ gallons; a barrel of oil averages from 50 to 53 gallons. (2) Dry measure. A barrel of flour contains 196 pounds.

II. Mechanics: The cylindrical part of a pulley.

III. Horology: (1) The barrel of a watch. The hollow cylinder or case in

which the mainspring works. It is connected with a chain by the fusee, by the winding of which the chain is unrolled from the cylinder, with the effect of winding the mainspring. (2) The chamber of a spring balance.

IV. Campanology: The sonorous portion of a bell.

V. Anatomy: Barrel of the ear: A cavity behind the tympanum, covered with a fire membrane. The belly and loins of a horse or cow are technically spoken of as the barrel.

VI. Nautical: (1) The main piece of a capstan. (2) The cylinder around which the tiller-ropes are wound.

VII. Music: The cylinder studded with pins by which the keys of a musical instrument are moved.

BARREN ISLAND, a volcano in the Andaman Sea, about 12° 15′ N. lat.; 93° 54 E. long. Its diameter is about 2 miles. There is an ancient crater over a mile in diameter, from the center of which a newer cone rises to a height of 1,015 feet. The volcano was active in 1789 and 1803, but is now semi-dormant.

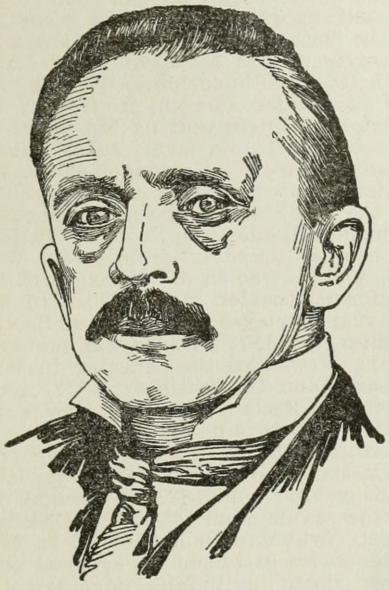
BARRÈS, MAURICE, a French novelist, born at Charmes-sur-Moselle in 1862. His first work was not especially notable, but he later developed remarkable powers of expression. These were devoted chiefly to attempts to induce the young men of the nation to remain in the provinces and build up national traditions. He was in 1906 elected to the Academy. He was for many years a member of the Chamber of Deputies. His best known works are "Les déracinés" (1897); "L'Appel au soldat" (1900); "Leurs figures" (1902); "Le voyage de Sparte" (1906); "En Italie" (1912).

BARRETT, JOHN, an American diplomatist, born in Grafton, Vt., Nov. 28, 1866; was graduated at Dartmouth College in 1889, and the same year went to the Pacific coast and was engaged in journalism till 1894. During 1894-1898 he was United States Minister Resident and Consul-General at Bangkok, Siam, and, after the expiration of his term of office, represented several American newspapers in Manila, Philippine Islands. After the American victory in Manila Bay he made a special study of conditions in the Philippine Islands. In 1903-1904 he was minister to Argentina, and in 1904-1905 held the same post in Panama. He was chiefly instrumental in establishing the Pan-American Union in 1907, and was its director-general until 1920, when he resigned to enter commercial life. His services in behalf of a better understanding between the countries of North, Central and South America were of the greatest value. Among his writings are: "Admiral George Dewey" (1909); and "Pan-American Commerce; Past, Present and Future" (1919).

BARRETT, LAWRENCE, an American actor, born in Paterson, N. J., April 4, 1838. His first appearance on the stage was in 1853. In 1859 he supported Booth, Charlotte Cushman and other eminent actors. He served as a captain in the 28th Massachusetts Infantry in the early part of the Civil War. Later he acted at Philadelphia, Washington, and at Winter Garden, in New York, where he was engaged by Mr. Booth to play Othello to his Iago. After this he became an associate manager of the Varieties Theater, in New Orleans, where for the first time he played the parts of Richelieu, Hamlet, and Shylock. In 1864 he secured "Rosedale" from Lester Wallack, and starred in it. Manager of the California theater, 1867-1870. In the last year he played with Booth at Booth's Theater. In 1871-1872 he was manager of the New Varieties Theater in New Orleans, and in December, 1872, acted Cassius to Booth's Brutus in New York. During 1873-1874 he made tours through the United States. In 1875 he appeared as Cassius in Booth's Theater, and later as King Lear. In 1882 he brought out "Francesca da Rimini," at the Chestnut Street Theater in Philadelphia. In 1887 he began his first joint engagement with Edwin Booth in Buffalo. Mr. Barrett's last production of a new play was "Guido Ferranti" by Oscar Wilde, in 1890, at the Broadway Theater, New York. His last appearance was on March 18, 1891, at the Broadway Theater as Adrian du Mauprat to the Richelieu of Mr. Booth. He died in New York City, March 21, 1891.

BARRETT, WILSON, an English dramatist, born in Essex, Feb. 18, 1846; son of a farmer; entered the dramatic profession in 1863. In 1874 he became manager of the Amphitheater in Leeds, and later lessee of the Grand Theater in Leeds; in 1879 manager of the Court Theater, London; and in 1881, of Princess' Theater, London. He visited the United States in 1886, and, returning to England in 1887, became manager of the Globe Theater; revisited the United States in 1888, and again in 1889; in 1896 became manager of the Lyric Theater, London; and in 1899, of the Lyceum. His publications include "The Sign of the Cross," "Pharaoh," "Now-a-Days," "Daughters of Babylon," etc. He died July 22, 1904.

BARRIE, SIR JAMES MATTHEW, a Scottish author, born in Kirriemuir, Forfarshire, May 9, 1860. He graduated from Edinburgh University in 1882, and went to London in 1885, to engage in journalism. His peculiar talent for depicting Scottish village life and rustic characters brought him fame. "Better Dead" (1887) and "When a Man's Single" (1888) were followed by "Auld Licht Idylls" (1888) and "A Window in



SIR JAMES MATTHEW BARRIE

Thrums" (1889), which first made him widely known; "An Edinburgh Eleven" (1890); "My Lady Nicotine" (1890); "The Little Minister" (1891); "Sentimental Tommy" (1896); "Margaret Ogilvy" (1896); "Tommy and Grizel" (1900); "Peter Pan in Kensington Gardens" (1906); "Peter and Wendy" (1911); etc. He has also written numerous short sketches and the comedies "Walker, London" (1892); "Jane Annie" (1893); "The Professor's Love Story" (1895); "Quality Street" (1903); "Peter Pan" (1904); "What Every Woman Knows" (1908); "Half Hours" (1908); "Mary Rose" (1920).

BARRIENTOS, MARIA, a Spanish soprano singer, born in Barcelona, Spain. She studied music in Madrid and first appeared in public at the age of 17 in Milan. Gaining instant success, she made tours in the leading European and South American countries. In 1915 she sang with the Metropolitan Opera Company in New York, of which organization she was a member for several years.

BARRIER REEF, a coral reef which extends for 1,260 miles off the N. E. coast of Australia, at a distance from land ranging from 10 to 100 miles.

BARRON, JAMES, an American naval officer, born in Virginia in 1769; became Lieutenant in the navy in 1798, and was soon promoted to Captain. He commanded the "Chesapeake" in 1807, and was attacked by the British ship "Leopard" as a result of his refusal to allow the "Chesapeake" to be searched for deserters. The "Chesapeake," which was quite unprepared, discharged one gun previous to striking her colors. She was captured and three alleged deserters were found. Barron was court-martialed and suspended for five years. Upon his restoration, as the outcome of a long correspondence with his personal enemy, Commodore Decatur, a duel was fought and Decatur was killed. Barron became senior officer in the navy in 1839, and died in Norfolk, Va., April 21, 1851.

BARROW, an artificial mound or tumulus, of stones or earth, piled up over the remains of the dead. Such erections were frequently made in ancient times in our own land, and are numerous in many countries. In Scotland they are called cairns. Burial in barrows seems to have been practiced as late as the 8th century A. D. One of the finest barrows in the world is Silbury Hill, Wiltshire, near Marlborough. It is 170 feet in perpendicular height, 316 along the slope, and covers about five acres of ground.

BARROW, a term applied to three prominent localities of the Arctic Ocean, in honor of Sir John Barrow. (1) Point Barrow on the N. coast of Alaska, in 71° 23′ N. lat. and 156° 31′ W. long., long considered as the most northerly spot on the American mainland. (2) Cape Barrow, on the coast of Canada, or Coronation Gulf, is at 68° N. lat., 111° W. long. (3) Barrow Strait, the earliest of Parry's discoveries, leading to the W. out of Lancaster Sound, which Parry's immediate predecessor, Captain, afterward Sir John Ross, had pronounced to be landlocked in that direction. Besides its main course to Melville Sound, Barrow Strait throws off Prince Regent's Inlet to the S. and Wellington Channel to the N. The passage averages about 50 miles in breadth, extending nearly along the parallel of 74° N., from 85° to 100° W.

BARROW, a river in the S. E. of Ireland, province of Leinster, rising on the borders of the King's and Queen's counties, and after a southerly course joining the Suir in forming Waterford harbor. It is the next in importance to

the Shannon, and is navigable for vessels of 200 tons for 25 miles above the sea.

BARROW, ISAAC, an English mathematician and clergyman, born in London, in 1630; studied at the Charterhouse and at Trinity College, Cambridge. After a course of medical studies he turned to divinity, mathematics, and astronomy, and graduated anew at Oxford in 1652. In 1659 he was ordained; in 1660 elected Greek professor at Cambridge; in 1662 Professor of Geometry in Gresham College; in 1663, Lucasian Professor of Mathematics at Cambridge. In 1670 he was created D. D., in 1672 Master of Trinity College, and in 1675 Vice-Chancellor of Cambridge University. He died in 1677. His principal mathematical works (written in Latin) are: "Elements of Euclid" (1655); "Data of Euclid" (1657); "Mathematical Lessons" (1664-1666); "Lessons in Geometry" (1670); "Works of Archimedes"; "Spherics of Theodosius" (1675). All his English works which are theological were left in MSS., and published by Dr. Tillotson, in 1685. As a mathematician Barrow was deemed inferior only to Newton.

BARROW-IN-FURNESS, an English seaport and county borough in Lancashire; opposite the island of Walney. Its prosperity is due to the mines of red hematite iron ore which abounds in the district. There is an extensive trade in timber, cattle, grain and flour; and iron ore and pig iron are largely shipped. It has numerous blast furnaces, and one of the largest Bessemer steel works in the world. Besides iron works a large business is done in ship building, the making of railway cars and rolling stock, ropes, sails, bricks, etc. Pop. about 75,000.

BARROWS, JOHN HENRY, an American educator, born in Medina, Mich., July 11, 1847; was graduated at Olivet College in 1867; subsequently studied in Yale College, Union and Andover Theological Seminaries, and at Göttingen. Pastor First Presbyterian Church, at Chicago, for 14 years; organized and was president of the World's Parliament of Religions at the World's Columbian Exposition in Chicago, in 1893. He delivered lectures on Christianity in universities in India, under the patronage of the University of Chicago, in 1896-1897, and became President of Oberlin College in 1898. He published "The Gospels are True Histories" (1891); "Henry Ward Beecher, the Pulpit Jupiter" (1893); "The World Pilgrimage"; "History of the Parliament of Religions"; etc. He died June 2, 1902.

BARRY, SIR CHARLES, an English architect, born in London, in 1795. After executing numerous important buildings, such as the Reform Club-house, London, St. Edward's School, Birmingham, etc., he was appointed architect of the new Houses of Parliament, at Westminster, with the execution of which he was occupied for more than 24 years. He was knighted in 1852, and died suddenly in 1860.

BARRY, JOHN, an American naval officer, born in Tacumshane, Ireland, in 1745. He settled in Philadelphia in 1760. When the Revolutionary War broke out he was appointed commander of the "Lexington," with which he captured the British tender "Edward," in 1776. He afterward took command of the "Raleigh," which was captured by the British "Experiment"; but in his next command, the "Alliance," he captured the British ships "Atlanta" and "Trepassy." He was chosen to convey Lafayette and Noailles back to France; and in 1794 was appointed commodore. He died in Philadelphia, Sept. 13, 1803.

BARRY, THOMAS HENRY, an American soldier, born in New York City in 1855. He graduated from the United States Military Academy in 1877 and was appointed 2d lieutenant in the same year. After promotion through various grades, he became lieutenant-colonel and assistant adjutant-general in 1900. In the same year he was appointed brigadier-general of volunteers and with that rank served with the China relief expedition and in the Philippines in 1901. He was appointed colonel and assistant adjutant-general of the regular army in 1902, brigadier-general in 1903, and major-general in 1908. In 1900 and 1901 he was chief of staff of the Division of the Philippines. From 1907 to 1909 he commanded the army of Cuban pacification, and was commander of the department of California until 1910, when he was appointed superintendent of the United States Military Academy. He was commander of the Eastern Department in 1913, the Philippine Department in 1915, and the Central Department in 1917. During the training of troops for the American Expeditionary Forces, he was commander at Camp Grant, and was commander of the 86th Division of the National Army until February, 1918, when he became again commander of the Central Department. He died Dec. 30, 1919.

BARRYMORE, ETHEL (Mrs. Russell G. Colt), an American actress, born in Philadelphia in 1879, the daughter of

Maurice Barrymore and Georgiana (Drew) Barrymore. She was educated privately and first appeared on the stage in John Drew's company in 1896. She later appeared in leading rôles with Henry Irving. She first appeared as a star in 1900, and later played as star in many successful plays. She was one of the most popular American actresses of her generation.

BARRYMORE, JOHN, an American actor, brother of Ethel Barrymore and son of Maurice Barrymore, born in 1882. He first appeared on the stage in 1903 and two years later played in London as leading man with great success. In 1919-1920 he appeared with his brother Lionel Barrymore in "The Jest" and following this appeared as the star in a production of "Richard III." He also appeared in several moving-picture plays, notably "Dr. Jekyl and Mr. Hyde."

BARRYMORE, MAURICE, an American actor, whose real name was Herbert Blythe, born in India in 1847. He was educated in Cambridge University, and entering upon a stage career, removed to the United States, where he quickly rose to eminence in his profession. In 1876 he married Georgiana Drew of the famous family of actors. He acted as leading man for Modjeska, for Mrs. Langtry, for Olga Nethersole, and for Mrs. Fiske. Barrymore was considered one of the most finished and accomplished actors of his day. He wrote several plays, including "Nadjeska," in which Mme. Modjeska appeared in 1884. He died in 1905.

BARSABAS, JOSEPH, surnamed "the Just," one of Christ's early disciples, and probably one of the 70. He was one of the two candidates nominated to fill the vacancy left by Judas Iscariot in the apostleship (Acts i).

BAR-SUR-AUBE (bär-sür-ōb'), a town in the department of Aube, France; 30 miles E. of Troyes; notable as the scene of a victory of the allied forces, commanded by Schwarzenberg, over the French, commanded by Macdonald and Oudinot, Feb. 27, 1814. The council which decided the plan of campaign of the allies was held here before the battle, Feb. 25. Pop. about 5,000.

BART, BARTH, or BAERT (bärt), **JEAN**, a French sailor, born at Dunkirk, 1650, the son of a poor fisherman. He became captain of a privateer, and was appointed captain in the Royal Navy and for exceptional service was made commodore and ennobled. He made the French navy everywhere respected, and furnished some of the most striking chapters in the romance of naval warfare. After the peace of Ryswick, he lived quietly at Dunkirk, and died there in 1702.

BARTHÉLEMY, JEAN JACQUES, a French antiquarian, born at Cassis, Provence, Jan. 20, 1716; won European fame with his "Travels of Young Anacharsis in Greece" (1788), a fascinating picture of domestic and social life in ancient Greece. As a romancer he wrote "The Loves of Carites and Polydorus" (1760). He died in Paris, April 30, 1795.

BARTHOLDI, FRÉDÉRIC AUGUSTE (bär-tōl-dē'), a French sculptor, born in Colmar, Alsace, April 2, 1834; received the cross of the Legion of Honor in 1865; principal works: the "Lion of Belfort"; statue of Lafayette, in Union Square, New York; bronze group of Lafayette and Washington, in Paris (1895); and the colossal figure in New York harbor, "Liberty Enlightening the World." He died Oct. 4, 1904.

BARTHOLOMEW FAIR, or BARTLEMY FAIR, a celebrated fair, which was long held in Smithfield at Bartholomew-tide. The charter authorizing it was granted by Henry I. in 1153, and it was proclaimed for the last time in 1855.

BARTHOLOMEW, MASSACRE OF ST., the massacre of French Protestants which began in Paris. In 1572, in the reign of Charles IX., many of the principal French Protestants were invited to Paris, under a solemn pledge of safety, on the occasion of the marriage of the King of Navarre, afterward Henry IV., with the French King's sister. Though doomed to destruction, they were treated for seven months with every possible mark of courtesy and confidence. Meanwhile the warrant for their destruction was issued by their sovereign, on whose word they had relied. This horrible butchery began on Aug. 24, that being St. Bartholomew's Day, on which, and the two following days, more than 10,000 Protestants were murdered in Paris. A like carnage ensued in the provinces, where upward of 25,000 more were destroyed by other bloodthirsty fanatics. Sully says that the number massacred throughout the kingdom amounted to 70,000. This deed was, however, applauded in Spain; at Rome, solemn thanksgivings were offered to God for its success, and medals were struck at Paris in honor of it; while, as a mark of Protestant detestation, Elizabeth and the English court put on deep mourning, and received the French embassy in solemn silence.

BARTHOLOMEW, ST., the apostle, probably the same person as Nathanael, mentioned, in the Gospel of St. John, as an upright Israelite, and one of the first disciples of Jesus. He is said to have taught Christianity in the south of Arabia, and to have carried there the Gospel of St. Matthew, in the Hebrew language, according to Eusebius. Chrysostom mentions that he preached in Armenia and Natolia. The ancient church had an apocryphal Gospel bearing his name, of which nothing has been preserved. The Catholic Church celebrates a feast in his honor, on the 24th of August.

BARTHOU, LOUIS, a French statesman, born in 1862. He entered public life at an early age and occupied many important positions in the French Government, including service as Minister of Public Works and Minister of the Interior. He was appointed Minister of Justice in the first cabinet of President Poincaré in 1913. On the fall of this ministry in March of the same year, he was appointed Premier and Minister of Public Instruction. He was one of the chief figures in the controversy between the French Government and the Roman Catholic Church, on the question of the separation of church and state and was especially zealous in carrying out the legislation passed in order to effect this separation.

BARTLESVILLE, a city of Oklahoma, the county-seat of Washington co. It is on the Atchison, Topeka and Santa Fé and the Missouri, Kansas and Texas railroads. It is in the Mid-Continent Oil Field, the growth of which has been the most notable phase of the petroleum industry in recent years. The town has a library, a court house, an Elks Home, city hall, and other public buildings. There are smelters of zinc and deposits of natural gas. Pop. (1910) 6,181; (1920) 14,417.

BARTLETT, SIR ELLIS ASHMEAD, an English politician, born in Brooklyn, N. Y., of American parents, in 1849; graduated at Christ Church College, Oxford, in 1872; admitted to the bar in 1877; was a member of Parliament from Eye division of Suffolk in 1880-1885; and from Ecclesall division of Suffolk since 1895; was Civil Lord of the Admiralty in 1885-1886, and 1886-1892. He is the author of "The Battlefields of Thessaly" (1897). He died in London, 1902.

BARTLETT, FREDERICK ORIN, an American writer, born in Haverhill, Mass., in 1876. He was educated in the public schools and at Harvard University. For several years he was engaged in newspaper work. His best known books are "The Web of the Golden Spider" (1909); "The Lady of the Lane" (1912); "The Triflers" (1917). He was a frequent contributor of short stories to magazines.

BARTLETT, JOHN, an American author and publisher, born in Plymouth, Mass., June 14, 1820; became a publisher in Cambridge in 1836, and senior partner in the Boston publishing house of Little, Brown & Co., in 1878. His works include "Familiar Quotations" (1854); "The Shakespeare Phrase-Book" (1882); "Catalogue of Books on Angling, Including Ichthyology, Pisciculture, etc." (1882); "The Shakespeare Index"; "The Complete Concordance to Shakespeare's Dramatic Works" (1894); and "Poems." He died Dec. 3, 1905.

BARTLETT, PAUL WAYLAND, an American sculptor, born in New Haven, Conn., in 1865. He was educated in the public schools of New Haven and Boston and studied sculpture in Paris. At the age of 14 he exhibited a bust of his grandmother in the Paris salon. He made many notable pieces of sculpture, including the statue of General Joseph Warren in Boston, the statue of Lafayette in Paris, which was a gift to France from the school children of the United States, a statue of Columbus in the Congressional Library, six statues on the front of the New York Public Library, and a statue of Benjamin Franklin. His works are found in many of the leading art galleries in the United States and abroad. He was a member of several societies, including the American Academy of Arts and Letters.

BARTLETT, ROBERT ABRAM, an American explorer, born at Brigus, Newfoundland, in 1875. After several years spent at sea he took part in the Peary expedition of 1897-1898 as commander of the vessel. This was followed by several other trips, including the journey with Peary in 1905-1909, which ended in the discovery of the North Pole. He followed this with several other expeditions to the Arctic regions, including the Crocker Land Relief Expedition to North Greenland in 1917. During the World War he was marine superintendent of the Army Transport Service. He was awarded several medals for his services in explorations and received an honorary degree from Bowdoin College in 1920.

BARTLETT, SAMUEL COLCORD, an American educator, born in Salisbury, N. H., Nov. 25, 1817; was educated at Dartmouth College, teaching there and

at Andover; was pastor of a church at Monson, Mass.; subsequently Professor of Philosophy in Western Reserve University, Ohio. He afterward became pastor of a church at Manchester, N. H., and later of the New England Church in Chicago. In 1858 he was made Professor of Biblical Literature in the Chicago Theological Seminary, where he remained until 1873. In 1877 he became president of Dartmouth College, resigning in 1892. He was author of "From Egypt to Palestine" (1879), and also wrote a part of "Smith's Dictionary of the Bible." He died in Hanover, N. H., Nov. 16, 1898.

BARTON, CLARA, an American philanthropist, born in Oxford, Mass., in 1830; was educated at Clinton, N. Y., and early became a teacher, and founded at Bordentown, N. J., a free school, opening it with six pupils. In 1854 it had grown to 600, when she became a clerk in the Patent office in Washington. On the outbreak of the Civil War she became a volunteer nurse in the army hospitals and on the battle-field. In 1864 she was appointed by General Butler to the charge of the hospitals at the front of the Army of the James. She was present at several battles, and in 1865 went to Andersonville, Ga., to identify and mark the graves of Union prisoners buried there, and was placed by President Lincoln in charge of the search for missing men of the Union armies. She lectured on her war experiences in 1866-1867. In the Franco-Prussian War, in 1870, she aided the Grand Duchess of Baden in preparing military hospitals, assisted the Red Cross Society, superintended the distribution of work to the poor of Strasburg, in 1871, after the siege, and in 1872 in Paris. She was decorated with the Golden Cross of Baden and the Iron Cross of Germany. On the organization of the American Red Cross Society in 1881, she was made its President, and in 1884 had charge of the relief of sufferers from the Mississippi and Ohio floods. She was Special Commissioner for Foreign Exhibits at the New Orleans Exposition in 1883, represented the United States at the Red Cross Conference in Geneva, Switzerland, in 1884, and was delegate to the International Peace Conference in Geneva the same year. In 1889 she had charge of relief of sufferers from the floods at Johnstown, Pa.; in 1892 distributed relief to the Russian famine sufferers; in 1896, personally directed relief measures at the scenes of the Armenian massacres; in 1898, at the request of President McKinley, took relief to the Cuban reconcentrados, and performed field work during the war with Spain; and in 1900 undertook to direct the relief of sufferers at Galveston. In 1904 she resigned her presidency of the Red Cross Society. Her published works include: "Story of the Red Cross" (1904); "Story of My Childhood" (1907). Miss Barton died in 1912.

BARTON, JAMES LEVI, an American clergyman, born in Charlotte, Vt., in 1855. He graduated from Middlebury College in 1881, and from the Hartford Theological Seminary in 1885. In the latter year he was ordained to the Congregational ministry. He served as missionary at Harpoot, Turkey, from 1885 to 1892. In 1893 he was appointed president of the Euphrates College at Harpoot. He served as a member of missionary deputations to Japan, India, and China. He wrote much on subjects connected with missionary work. The best known of his books are "The Missionary and His Critics"; "Daybreak in Turkey"; "Human Progress Through Missions"; "Educational Missions."

BARTON, WILLIAM ELEAZAR, an American clergyman and writer, born in Sublette, Ill., in 1861. He graduated from Berea College in 1885 and from the Oberlin Theological Seminary in 1890. In 1885 he was ordained to the Congregational ministry and filled pastorates in Ohio and Boston and Chicago, until 1899. He served on the editorial staff of several religious papers and was lecturer of applied practical theology at the Chicago Theological Seminary from 1905 to 1909. From 1911 he lectured at the same institution on ecclesiastical law. He was a member of the editorial staff of the "Youth's Companion" and was an officer of many theological and missionary societies. He was a prolific writer on religious and historical topics. Among his works are "A Hero in Homespun" (1897); "The Psalms and Their Story" (1898); "I Go A-Fishing" (1901); "Bible Classics" (1911); "Into All the World" (1911).

BARTRAM, JOHN, an American botanist, born in Chester co., Pa., March 23, 1699; was called the "father of American botany," and founded at Kingsessing the first botanical garden in America. Linnæus termed him "the greatest natural botanist in the world." He published "Observations on the Inhabitants, Climate, Soil, Diverse Productions, Animals, etc., Made in His Travels from Pennsylvania to Lake Ontario," and a similar volume on eastern Florida (1766). He died at Kingsessing, near Philadelphia, Pa., Sept. 22, 1777.

BARUCH, BERNARD MANNES, an American financier and public official. He graduated from the College of the City

of New York in 1899. For many years he was a member of the New York Stock Exchange and acquired a large fortune. In 1915 he was appointed by President Wilson a member of the Advisory Commission of the Council of National Defense. He was also a member of the Commission on Raw Materials, Minerals and Metals, and a member of the commission in charge of purchases for the War Industries Board. He was appointed chairman of the War Industries Board in 1918. During the negotiations of the peace treaty in Paris he acted as financial adviser to the American delegates.

BARUCH, SIMON, an American physician, born at Schwersenz, Germany, in 1840. He received his early education in Germany. Removing to the United States he graduated from the Medical College of Virginia in 1862. He was surgeon in the Confederate Army until 1865, and was captured during this service. Following the war, he practiced medicine in Camden, S. C., until 1881, when he removed to New York and became consulting physician on chronic diseases. He diagnosed the first recorded case of perforating appendicitis and successfully operated on it. He was instrumental in introducing free municipal baths in New York City. For many years he was on the medical staff of the College of Physicians and Surgeons at Columbia, and was one of the most noted physicians of the United States. He was the author of "Uses of Water in Modern Medicine" (1892); "The Principles and Practice of Hydrotherapy." In 1913 a hospital was erected in his honor at Camden, S. C.

BARUS, CARL, an American physicist, born in Cincinnati in 1856. He was educated at Columbia University and in Germany, and he took post-graduate courses at Brown and Clark universities. He served in various departments of the United States Government as physicist and became, in 1895, professor of physics at Brown University. From 1903 he was dean of the graduate department of that university. He was awarded the Rumford Medal of the American Academy of Arts and Sciences for researches in heat. He was a member of many important commissions on chemical subjects, and was a member also of many scientific societies. His writings include "Compressibility of Liquids" (1892); "Condensation of Atmospheric Moisture" (1895); "Diffusion of Gases through Liquids" (1913).

BARYE, ANTOINE LOUIS, a French sculptor, born in Paris, Sept. 24, 1795. He studied engraving with Fourrier and a goldsmith named Beinnais; in 1812, was a topographical engineer; in 1816 studied drawing with the painter Gros, and sculpture with Basio; and, in 1819, took the second prize for a "Milo di Crotona," which was awarded him at the Concours of the Beaux Arts. From 1823 till 1831 he worked under Fauconnier, jeweler to the Duchesse d'Angoulême. In 1831 he exhibited the celebrated "Tiger Devouring a Crocodile." He was an officer of the Legion of Honor, a member of the Institute, and a professor at the Jardin des Plantes. He died in Paris, June 25, 1875.

BARYTA, or **BARYTES**, or **OXIDE OF BARIUM**, symbol BaO—the earth present in the minerals witherite (carbonate of barium) and heavy spar (sulphate of barium). Baryta belongs to the group of alkaline earths, and has the property of acting like an alkali on coloring matters. It has a very harsh taste, is highly caustic, and is very poisonous. The presence of carbonic acid gas may be detected by exposing a solution of baryta to the air, when carbonic acid combines with the baryta and forms a film of white carbonate of barium, $BaCO_3$. Baryta exposed to air or oxygen absorbs oxygen, forming peroxide of barium. On this being heated oxygen is liberated and baryta again produced. The sulphate of baryta, $BaSO_4$, otherwise called ponderous or heavy spar, is found in fissures or cracks in other rocks. It is crystalline, and is sometimes found pure and white, but generally presents a flesh-red color, from the red oxide of iron (rust) incorporated in it. The rust can be got quit of by reducing the sulphate of baryta to a fine powder under rollers or traveling wheels, and subjecting the pulverized material to the action of dilute sulphuric acid, which dissolves the oxide of iron, and leaves the sulphate of baryta as a white, dense powder. The principal use of heavy spar is as a pigment under the name of permanent white; but having little opacity, it cannot be employed by itself, but only when mixed with ordinary white lead. Several mixtures of sulphate of baryta and white lead are manufactured, and are known in commerce. Venice white contains one part sulphate of baryta and one part white lead. Hamburg white contains two parts sulphate of baryta and one part of white lead. Dutch white contains three parts sulphate of baryta and one part white lead. The native sulphate of baryta has been employed by the celebrated potter Wedgewood in the manu-

facture of jasper ware, and for the formation of white figures, etc.

BASALT, a word said to have been derived from an African word, and to have meant basaltoid syenite, from Ethiopia or upper Egypt. In general the name is given to any trap rock of a black, bluish, or leaden gray color, and possessed of a uniform and compact texture.

In a special sense it is a trap rock consisting of augite, feldspar and iron intimately blended, olivine also being not unfrequently present. The augite is the predominant mineral; it is, sometimes, however, exchanged for hornblende, to which it is much akin. The iron is usually magnetic, and is, moreover, often conjoined with titanium. Other minerals are also occasionally present, one being labradorite. It is distinguished from doleryte or dolerite by its possessing chlorine disseminated through it in grains. It is of a very hard, endurable nature, and may be used to advantage in macadamizing roads.

The specific gravity of basalt is 3.00. There are fine columnar basalts at the Giant's Causeway in the N. of Ireland; in Scotland at Fingal's Cave and other parts of the Island of Staffa; and along the sides of many hills in the old volcanic district of western and central India. At West Orange, N. J., the face of the First Mountain exhibits basaltic formations, the lines being diagonal and suggesting a huge open fan, with its ribs converging near the ground.

BASEBALL, a field game played principally in the United States. It originated in the English school-boy game of "rounders." It is played by two teams of nine men each. There are four bases, 90 feet apart, forming a perfect square, which is called the diamond. The home plate, or starting point, is at right angles with the first and third bases, with the second base on a straight line from the home plate, and 127 ft. 3⅜ in. distant. The pitcher is placed behind a line 60 ft. 6 in. away from the home plate, and on a straight imaginary line with the home and second base. The catcher must be within 10 ft. of home base whenever the pitcher delivers the ball to the bat, nor may he leave his position directly back of the plate for the purpose of aiding the pitcher to give intentionally a base on balls. A player is stationed at each one of the three bases, and designated first, second and third basemen. Another man known as the shortstop, is stationed midway between second and third bases, while the three men in the outfield are called the right, center and left fielders. Lines are drawn from the home plate to first and third bases respectively, and extended to the boundaries of the field, or to a point where a flag is stationed, and known as the foul flag. All balls hit within these lines are fair, and all those which are not, are foul. The umpires are the sole judges on all questions during the progress of the game. All fair or foul balls caught on the fly are out, and when three men are out all are out.

The game consists of nine full innings, unless the side last at bat has made more runs at the conclusion of the eighth inning than the opposing side scored at the end of their ninth. Besides putting the side out on fly-ball catches, they are also put out at first base on balls thrown to that point by any of the in or out fielders, before the batsman, who becomes a base runner the moment he hits the ball, reaches that point, and when the batsman strikes three times at the ball without hitting it. They can also be put out before they reach the other three bases, but must be touched with the ball by a player on the opposing team. The game is one of great chance, which is the secret of its wide popularity. A regulation ball and bat are used. The ball weighs not less than 5 nor more than 5¼ ounces, avoir., and measures not less than 9 nor more than 9¼ in. in circumference. It has wrapped cork or rubber core covered with horsehide. The bat is round, made of wood, not to exceed 42 in. in length, and does not exceed 2¾ in. in diameter in the thickest part. The game has been developed into such a scientific state that the average time for playing is only two hours, while many games are played in an hour and a half.

The sport has had an immense development in the present century. There is hardly a town or village in the country without its local team. In the great cities, baseball has become a great business enterprise with the highly paid teams, great crowds of spectators and receipts running into the millions. Despite the commercial features of the game, however, it has been kept remarkably clean from any suspicion of unfair play. The sporadic instances that have cropped up of players betting on games or throwing games have been instantly and severely dealt with. In the autumn of 1920 startling evidence was disclosed of the deliberate "throwing" of games in the world championship series of 1919. Drastic measures were at once taken to remedy these conditions. The first professional team of paid players was the Cincinnati Red Stockings organized in 1869. They had a remarkable series

of successes, going through their first season without losing a game. Following this, various leagues and associations were formed, composed of teams in different cities who played a series of games with each other, the winner of the most games at the end of the season being styled the champion, privileged to fly a championship pennant. At present, there are a large number of leagues, but the leading ones, attracting the most interest and comprised of the best players in the country, are the National and the American, the so-called Major Leagues. Each has a circuit of eight cities. At the end of each season the leaders in their respective leagues play a series of games with each other for the title of World's champions. The record of the World's Series games from 1905 to 1920, inclusive, follow:

Year and Winning Club	Games	Runs	Year and Losing Club	Games	Runs
1905—New York Nationals....	4	15	1905—Philadelphia Americans.	1	3
1906—Chicago Americans.....	4	22	1906—Chicago Nationals.....	2	18
*1907—Chicago Nationals.....	4	19	*1907—Detroit Americans.....	0	6
1908—Chicago Nationals.....	4	24	1908—Detroit Americans.....	1	15
1909—Pittsburgh Nationals...	4	34	1909—Detroit Americans.....	3	28
1910—Philadelphia Americans.	4	35	1910—Chicago Nationals.....	1	15
1911—Philadelphia Americans.	4	27	1911—New York Nationals....	2	13
*1912—Boston Americans.....	4	25	*1912—New York Nationals....	3	31
1913—Philadelphia Americans.	4	23	1913—New York Nationals....	1	15
1914—Boston Nationals.....	4	16	1914—Philadelphia Americans.	0	6
1915—Boston Americans.....	4	12	1915—Philadelphia Nationals..	1	10
1916—Boston Americans.....	4	21	1916—Brooklyn Nationals.....	1	13
1917—Chicago Americans.....	4	21	1917—New York Nationals....	2	17
1918—Boston Americans.....	4	9	1918—Chicago Nationals.....	2	10
1919—Cincinnati Nationals....	5	35	1919—Chicago Americans.....	3	20
1920—Cleveland Americans....	5	21	1920—Brooklyn Nationals....	2	8

*Tie game.

SUMMARY

	Series Won	Series Lost	Games Won	Games Lost	Runs
American League	10	6	49	42	294
National League	6	10	42	49	293

Total series, 16; total games, 91, including two tie games; total runs, 587.

BASEL (bä-zel), **BASLE**, or **BÂLE**, a canton and city of Switzerland. The canton borders on Alsace and Baden, has an area of 163 square miles, and a population of about 225,000, nearly all speaking German. It is divided into two half-cantons, Basel city (Basel-Stadt) and Basel country (Basel-Landschaft). The former consists of the city and its precincts, the remainder of the canton forming Basel-Landschaft, the capital of which is Liestal. The city of Basel is 43 miles N. of Bern, and consists of two parts on opposite sides of the Rhine, has an ancient cathedral, founded 1010, containing the tombs of Erasmus and other eminent persons; a university, founded in 1459, with an important library, a museum containing the valuable public library, pictures, etc. The industries embrace silk ribbons, tanning, paper, aniline dyes, brewing, etc.; and the advantageous position of Basel, a little below where the Rhine becomes navigable and at the terminus of the French and German railways, has made it the emporium of a most important trade. At Basel was signed the treaty of peace between France and Prussia, April 5, and that between France and Spain, July 22, 1795. Pop. about 135,000.

BASEL, CONFESSION OF, a Calvinistic confession introduced by Œcolampadius at the opening of the Synod of Basel (1531). It was adopted by the Protestants of Basel in 1534.

BASEL, COUNCIL OF, a celebrated Ecumenical council of the Church, convoked by Pope Martin V. and his successor, Eugenius IV. It was opened Dec. 14, 1431, under the presidency of the Cardinal Legate Juliano Cesarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Christian nations under the Catholic Church, to put a stop to wars between Christian princes, and to reform the Church. But its first steps toward a peaceable reconciliation with the Hussites were displeasing to the Pope, who authorized the Cardinal Legate to dissolve the Council. That body opposed the pretensions of the Pope, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the Emperor Sigismund, of the German princes, and of France. On the Pope continuing to issue bulls for its dissolution the Council commenced a formal process against him, and cited him to appear at its bar. On his refusal to comply with this demand the Council declared him guilty of contumacy, and, after Eugenius had opened a counter synod at Ferrara, decreed his suspension from

the papal chair (Jan. 24, 1438). The removal of Eugenius, however, seemed so impracticable, that some prelates, including the Cardinal Legate Juliano, left Basel, and went over to the party of Eugenius. The Archbishop of Arles, Cardinal Louis Allemand, was now made First President of the Council. In May, 1439, it declared Eugenius a heretic and formally deposed him. Excommunicated by Eugenius, they elected the Duke Amadeus of Savoy to the papal chair. Felix V.—the name he adopted—was acknowledged by only a few princes, cities, and universities. After this the moral power of the Council declined; it was dissolved May 7, 1449, when it gave in its adhesion to Nicholas V., the successor of Eugenius. The decrees of the Council of Basel are admitted into none of the Roman collections. They are regarded, however, as of authority in points of canon law in France and Germany, as their regulations for the reformation of the Church have been adopted in the pragmatic sanctions of both countries.

BASHAN, a rich, hilly district, lying E. of the Jordan, and between the mountains of Hermon on the N., and those of Gilead and Ammon on the S. The country takes its name ("fat," "fruitful") from its soft and sandy soil. It is celebrated in Scripture for its stately oaks, fine breeds of cattle, and rich pasturage. Modern travelers describe the country as still abounding with verdant and fertile meadows. Bashan was assigned, after the conquest of Og and his people, to the half tribe of Manasseh. From it came the Greek name Batanæa, in modern Arabic El-Bottein. But this latter only included its S. part. The ancient Bashan covered the Roman provinces named Gaulonites, Trachonites, Auranites, Batanæa, and Ituræa.

BASHKIRTSEFF, MARIE (bäsh-kērts'ef), a Russian author, born in Russia in 1860; came of a noble and wealthy family, went to Italy to study singing, and to Paris to study art. Her fame rests on her private "Journal," begun in her thirteenth year, which seems to have been written with ultimate publication in view. She died in Paris in 1884.

BASIC SLAG, the slag or refuse matter which is obtained in making basic steel, and which from the phosphate of lime it contains is a valuable fertilizer.

BASIL, a labiate plant, *ocymum basilicum*, a native of India, much used in cookery, especially in France, and known more particularly as sweet or common basil. Bush or lesser basil is *O. minimum;* wild basil belongs to a different genus, being the *calamintha clinopodium.*

BASIL I., The Macedonian, Emperor of the East, was of low origin, but obtained employment at the court of the Emperor Michael III., became his chamberlain, murdered his rival, Bardas, then Michael, and succeeded him in 867. He governed wisely, and compiled a body of laws called the Basilica, which, augmented by his son and successor, Leo the Philosopher, were in force till the fall of the empire. Basil I. deprived Photius of the See of Constantinople, and restored Ignatius, on whose death he recalled Photius. He successfully carried on war with the Saracens. Died in 886.

BASIL II., Emperor of the East, was son of Romanus II., and with his brother, Constantine, was first associated in the empire by John Zimisces, and succeeded him in 976. His long reign was a series of wars with his rivals, Bardas, Sclernus, and Phocas, with the Saracens and Bulgarians. The war ended in 1019, by the complete conquest of Bulgaria. Died in 1025.

BASIL, ST., surnamed THE GREAT, Bishop of Cæsarea, in Cappadocia, where he was born about 326. He was studying at Athens in 355. After extensive travels, St. Basil retired to the Desert of Pontus, and there founded an order of monks. He succeeded Eusebius in the See of Cæsarea in 370, and by his opposition to Arian doctrines greatly offended the Emperor Valens. He died in 380.

BASILAN, the largest island of the Sulu Archipelago, Philippine Islands. Basilan is about 36 miles long and situated S. of Mindanao. It is separated from Mindanao by a strait only 9 miles wide. This island is very mountainous, and most of it is covered by virgin forests. The soil is extremely rich and produces cotton, coffee, sugar, chocolate, tobacco, indigo, and spices of all sorts. Pop. about 8,000. The name Basilan is also applied to the whole group of 34 adjacent islets. The leading port is Isabela, on Basilan Strait.

BASILICA, originally the hall or court-room in which the King administered the laws made by himself and the chiefs who formed his council. When the Christian religion was made the state religion in Rome many of these buildings were given up to the new sect; the arrangement of that portion of the interior where the official business was conducted easily lending itself to the Christian ritual. In some of the oldest

basilicas in Rome, *e. g.*, in the subterranean Church of San Clemente, the early development of the Christian arrangement from the Roman is still to be seen. Many of the oldest and most splendid of the Roman churches are built on the plan of the basilica, and are called basilicas in consequence.

BASILICATA, the ancient Lucania, in south Italy, composed solely of the province of Potenza; so called after the Emperor Basilius II., who reconquered it from the Saracens and Lombards in the 11th century. It is mountainous, several peaks rising to upward of 4,500 feet (Monte Pollino, 7,375 feet). The Apennines here divide into two parts, which branch off to the E. and W. From these the rivers Bradano, Basento, Salandrella, Agri, and Sinni, take their source, and, after draining this fertile district, fall into the Gulf of Taranto in the Ionian Sea. There are also many lakes, some of volcanic origin. The chief are Monticchio, Pesole, Maorno, and Santa Palagina. The bulk of the people are poor and ignorant, and talk a dialect called basilisco. Its coast line is for the most part marshy, and, as a consequence, unhealthful. The products are varied. On the slopes of the Apennines, forests and pasture grounds are numerous, and the chestnuts plentiful. In the vast plains that extend to Apulia and Calabria wheat is the principal product, while toward Melfi and the neighborhood of Melfi it is noted for its excellent wine. The orange and lemon grow well nearer the coast. Among other products are cotton, flax, silk, honey, wax, liquorice, dried fruit, saffron, tobacco, etc. There are marble quarries at Avigliano, Latronico, Muro, Lucano, and Picerno; chalk at Mauro Forte and Montemuro; transparent quartz at Lagorgero; tufa at Matera; and excellent lignite at San Chirico Raparo and Rotonda. Capital, Potenza (pop. 20,000). Area, 3,855 square miles. Pop. about 500,000.

BASILICON, a name of several ointments, the chief ingredients of which are wax, pitch, resin, and olive oil.

BASILISCUS, an Emperor of the East; lived in the 5th century. He was the brother of Leo's wife, Verina. As commander of a large armament sent against the Vandals, he was defeated (468) by Genseric. In 474 he usurped the throne; but in 476 was defeated, deposed, and imprisoned by Zeno.

BASKERVILLE, CHARLES, an American chemist, born in Noxubee co., Miss., in 1870. He graduated from the University of Virginia in 1890 and carried on post-graduate courses in Germany. He filled various chairs in the department of chemistry in the University of North Carolina from 1891 to 1904, and in the latter year was appointed professor of chemistry and director of the College of the City of New York. He was the discoverer of several new elements including carolinium and berzellum, and carried on important investigations in the chemistry of anesthetics. He was a member of many chemical societies. His writings on chemical subjects include "School Chemistry" (1898); "Radium and Its Application in Medicine" (1909); "Municipal Chemistry"; and many articles in scientific magazines. He was the inventor of several processes for the refining of oil.

BASKET, originally a light and airy vessel made of plaited osiers, twigs, or similar flexible material, much used in domestic arrangements. The baskets made by the old inhabitants of Great Britain were so good that they became celebrated at Rome.

BASKET BALL, an indoor game played upon a circumscribed space on a floor, usually by five players on each side. At each end of this playing space a basket is placed at a height of about 10 feet. The ball is round, somewhat lighter than a football, and is passed from one player to another by throwing, or striking with the hands only; the ultimate object being to lodge it in the opponent's basket, which action counts one point. The rules as to interference, playing out of bounds, etc., are adapted from those of football.

BASLE. See BASEL.

BASQUES, or **BISCAYANS** (in their own language, *Euscaldunac*), a remarkable race of people dwelling partly in the S. W. corner of France, but mostly in the N. of Spain adjacent to the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. They preserve their ancient language, former manners, and national dances, and make admirable soldiers, especially in guerrilla warfare. Their language is highly polysynthetic, and no connection between it and any other language has as yet been made out. There are four principal dialects, which are not only distinguished by their pronunciation and grammatical structure, but differ even in their vocabularies. The Basques (about 700,000) occupy in Spain the provinces of Biscay, Guipuzcoa, and Alava; in France parts of the departments of the Upper and Lower Pyrenees, Ariége, and Upper Garonne. Some 200,000 are said to have emigrated

during the second half of the 19th century to South America.

BASRA. See BASSORA.

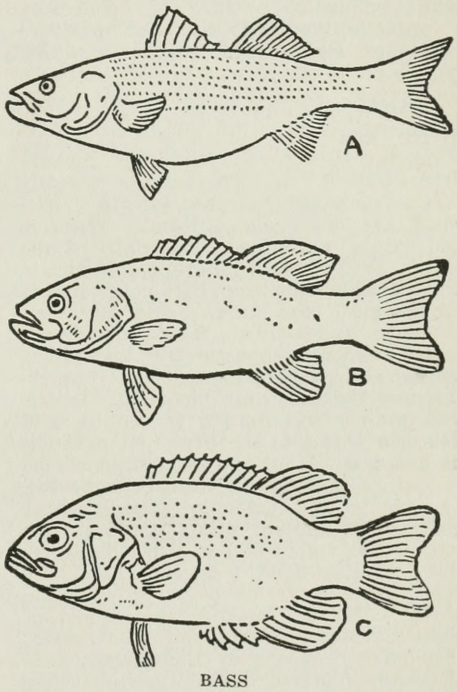
BASS, in music. (1) The string which gives a bass sound. (2) An instrument which plays the bass part; especially of the violoncello or bass-viol, and the contrabasso or double bass. Both this and the previous sense are found in the following example: (3) The lowest of the principal human voices; those higher in pitch being, respectively, baritone, tenor, alto or contralto, mezzo-soprano, soprano. (4) The portion of a choir singing the bass part; also the portion of string band playing the bass part. (5) The lowest instrument of any class or family of instruments; as bass clarionet, bass flute, bass horn, bass trombone, bass tuba, bass viol or base viol. (6) The string of lowest pitch on a string instrument having deep sounds. (7) Bass clef: The lowest sign of absolute pitch used in music; the F clef.

A fundamental bass: The supposed generator or foundation of any harmonic combination. Thus C is said to be the fundamental base of the chord G, C, E.

Thorough or continuous bass: Originally the bass part figured for the player on a harpsichord or organ. Hence, the art of adding chords to a figured bass; the art of harmony.

BASS, the name of a number of fishes of several genera, but originally belonging to a genus of sea fishes (*labrax*) of the perch family, distinguished from the true perches by having the tongue covered by small teeth and the preoperculum smooth. *L. lupus,* the only British species, called also seadace, and from its voracity sea-wolf, resembles somewhat the salmon in shape, and is much esteemed for the table, weighing about 15 pounds. *L. lineatus* (*roccus lineatus*), or striped bass, an American species, weighing from 25 to 30 pounds, is much used for food, and is also known as rockfish. Two species of black bass (*micropterus salmonides* and *M. dolomieu*), American fresh water fishes, are excellent as food and give fine sport to the angler. The former is often called the large mouthed black bass, from the size of its mouth. Both make nests and take great care of their eggs and young. The *centropristis nigricans,* an American sea fish of the perch family, and weighing two to three pounds, is known as the sea bass.

BASS, JOHN FOSTER, American war correspondent, born in Chicago, 1866; graduated at Harvard University, 1891. He served as a newspaper correspondent during the Cretan insurrection (1895); traversed the country where the Armenian massacres took place (1896); was at the front in the Greek war of 1898, and in the Spanish-American war of the same year. He was in China during the Boxer rebellion in 1900, and was for several months with Kuroki's army in the Russo-Japanese war of 1904. During the World War he followed the Russian campaigns of 1914-1915, was on the French and Balkan fronts 1915-1917, and covered the Italian military operations in 1918.



BASS

A. Striped Bass. B. Black Bass. C. Rock Bass.

BASSANO (bäs-ä'no), a commercial city of north Italy, province of Vicenza, on the Brenta. It has lofty old walls, an old castle, various industries, and an active trade. Near Bassano, Sept. 8, 1796, Bonaparte defeated the Austrians. Pop. about 20,000.

BASSEIN. (1) A thriving town in Burma, India, capital of a district of the same name, on the left bank of the Bassein river, one of the mouths of the Irawadi, 90 miles from the sea, but accessible to the largest ships. It is an important center of the rice trade, has considerable trade with Madras, and in a military view also is important, as it completely commands the navigation of

the stream. It was captured by the British in 1852. Pop. about 40,000. The district of Bassein has an area of 4,127 square miles, and a pop. of about 500,000. (2) Bassein, a decayed town of about 10,000 inhabitants, 28 miles N. of Bombay. Ceded to the Portuguese in 1534, it was a place of much importance as late as 1720; its remains still point to former splendor. In 1765 it was wrested from the Portuguese by the Mahrattas, and in 1780 surrendered to the British, after a 12 days' siege.

BASSES-ALPES (bäs-älp), (Lower Alps). See ALPES, BASSES.

BASSES-PYRÉNÉES (bäs-pēr-nā'), (Lower Pyrénées). See PYRÉNÉES, BASSES.

BASSET, a game at cards, played somewhat similar to the modern faro. It is of Venetian invention, and was formerly much played in France.

BASSE-TERRE (bäs-tār), (French, lowland), the name of the capitals of St. Christopher island, British West Indies (pop. about 9,000), and of Guadeloupe, the French West Indian island (pop. about 8,000).

BASSET-HORN, a musical instrument, the tenor of the clarionet family, having more than three octaves in its compass, extending upward from F below the bass stave. Unlike the clarionet it has a bell-mouth of metal.

BASSETT, JOHN SPENCER, an American historian, born in Tarboro, N. C., Sept. 10, 1867; graduated at Trinity College, Durham, N. C., in 1888, and took a Ph. D. at Johns Hopkins in 1894. He became professor of history at Trinity College, and later at Smith College. His works include "Constitutional Beginnings in North Carolina," "Slavery and Servitude in the Colony of North Carolina," "Anti-Slavery Leaders of North Carolina," "Slavery in the State of North Carolina," "The War of the Regulation," "The Federalist System" (1906); "Life of Andrew Jackson" (1911); "Short History U. S." (1916); "Story of the Great War" (1920); etc.

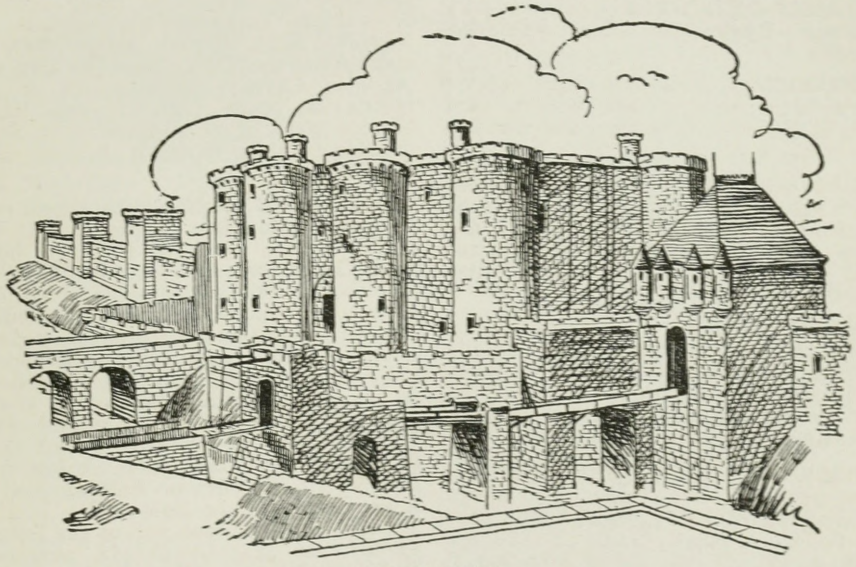
BASSORA, or **BASRA**, a town of former Asiatic Turkey, the capital of the vilayet of the same name (area, 53,580 square miles; pop. about 785,000), on the W. bank of the Euphrates, here called the Shat-el-Arab, 56 miles from its mouth in the Persian Gulf. The river is divided into a number of channels, and, by evaporation and frequent overflowing, makes the climate very unhealthful. Most of the houses are low huts, built of unburned bricks. The population, which had sunk to a few thousand, greatly increased when the British established the Tigris and Euphrates Steamship Company and is now about 60,000. A good business is done in the exchange of the productions of Turkey and Persia for Indian and European goods, particularly articles of British manufacture. The town has become the principal port of Mesopotamia. Bassora was founded in 636 by the Caliph Omar, and soon became one of the most famous and opulent cities of the East. The possession of it has been the subject of many contests between the Turks and the Persians. On Nov. 23, 1914, British forces defeated and routed the Turks near the city and occupied Basra. As a result of the treaty of peace with Turkey Basra became part of the independent State of Mesopotamia under a British mandate.

BASS ROCK, a remarkable island rock of Haddingstonshire, Scotland, near the mouth of the Firth of Forth, 2 miles from Canty Bay, and 3¼ miles E. N. E. of North Berwick. Composed of volcanic greenstone and trap tuff, it is about a mile in circumference, nearly round, and 313 feet high. It is inaccessible on all sides except the S., where it shelves down to the water. It is inhabited by countless numbers of solan geese and other birds. A cavern tunnels the rock from W. to E., and is accessible at low tide. In 756 St. Balthere or Baldred died in a hermitage on the Bass Rock; in 1316 it came into the possession of the Lauder family. In 1671 Charles II. purchased it for £4,000, and within its dreary dungeons many of the most eminent of the Covenanters were confined during his and James II.'s reign. The Bass was the last spot in the British Islands which held out for the Stuarts, being captured only in 1694. In 1701 the fortifications were demolished. In 1902 a lighthouse was established there.

BASS STRAIT, a channel beset with islands, which separates Australia from Tasmania, 185 miles long and from 80 to 150 miles broad, discovered by George Bass, a surgeon in the Royal navy, in 1798.

BASTARD, a child begotten and born out of wedlock; an illegitimate child. By the civil and canon laws, and by the law of Scotland (as well as some States of the United States), a bastard becomes legitimate by the intermarriage of the parents at any future time. But, by the laws of England, a child, to be legiti-

mate, must at least be born after the lawful marriage; it does not require that the child shall be begotten in wedlock, but it is indispensable that it should be born after marriage, no matter how short the time, the law presuming it to be the child of the husband. The only incapacity of a bastard is that he cannot be heir or next of kin to anyone save his own issue. In England the maintenance of a bastard in the first instance devolves on the mother, while in Scotland it is a joint burden upon both parents. The mother is entitled to the custody of the child in preference to the father.



THE BASTILLE

BASTIA, the former capital of Corsica, in the N. E. part of the island, 95 miles N. N. E. of Ajaccio. Antimony mining, boat building, iron founding, tunny and coral fishing are carried on; besides, there is some trade in oil, wine, and fruit. Population about 30,000. Bastia was founded in 1388 by the Genoese Leonello Lomellino, and was the seat of the Genoese governors for 400 years. It has several times been in the hands of the English, who, under Admiral Hood, last captured the town in 1794.

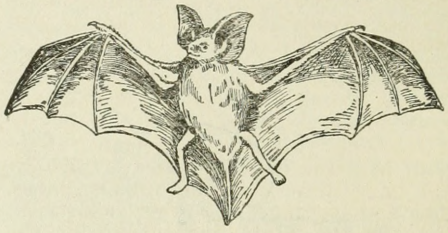
BASTILLE (bäs-tēl'), formerly, in France, a general term for a strong fortress defended by towers or bastions, and in this sense it was used in England after the Norman Conquest. The famous prison to which the name was latterly appropriated was originally the Castle of Paris, and was built by order of Charles V., between 1370 and 1383, by Hugo Aubroit, Provost of Paris, at Porte St. Antoine, as a defense against the English. Afterward it was provided with vast bulwarks and ditches. On each of its longer sides the Bastille had four towers, of five stories each, over which there ran a gallery, which was armed with cannon. It was partly in these towers, and partly in cellars under the level of the ground, that the prisons were situated. The Bastille was capable of containing 70 to 80 prisoners. On July 14, 1789, it was surrounded by an armed mob enraged by the reactionary policy of the court. The garrison consisted of 82 old soldiers and 33 Swiss. Negotiations with the governor of the prison having failed, the mob cut the chains of the drawbridge and a contest took place, in which one of the besieged and 150 of the people were killed or severely wounded. The arrival of a portion of the troops which had already joined the people, with four field-pieces, turned the fortune of the conflict in favor of the besiegers. Delaunay, the governor—who had been prevented by one of the officers when on the point of blowing the fortress into the air—permitted the second drawbridge to be lowered, and the people rushed in, killing Delaunay himself and several of his officers. The destruction commenced on the following day, amid the thunder of cannon and the pealing of the *Te Deum*. This event, in itself apparently of no great moment, leading only to the re-

lease of three prisoners, broke the spirit of the court party and changed the current of events in France. The anniversary of the fall of the Bastille has been regularly observed since France last became a Republic.

BASTION, a projecting mass of earth or masonry at the angle of a fortification, having two faces and two flanks, and so constructed that every part of it may be defended by the flank fire of some other part of the fort. The flanks of adjacent bastions are connected by a curtain. The distance between two such flanks is termed the gorge. A detached bastion is called a lunette. Also: (a) A composed bastion is one which has two sides of the interior polygon very irregular, with the effect of making the gorges also irregular. (b) A cut bastion is one which has a re-entering angle instead of a point. (c) A deformed bastion is one in which the irregularity of the lines and angles prevents the structure from having a regular form. (d) A demi-bastion is a bastion composed of one face only, with but a single flank and a demi-gorge. (e) A double bastion is a bastion raised on the plane of another one. (f) A flat bastion is one erected in the middle of a curtain when the latter is too long to be protected by the bastions at its ends. (g) A hollow bastion is one hollow in the interior. (h) A regular bastion is one so planned as to possess the true proportion of its faces, flanks, and gorges. (i) A solid bastion is one solid throughout its entire structure.

BASUTOLAND, a native province and British South African territory, between the provinces of Orange Free State, Natal and Cape of Good Hope. The Basutos belong chiefly to the great stem of the Bechuanas, and have made greater advances in civilization than perhaps any other South African race. In 1866 the Basutos, who had lived under a semi-protectorate of the British since 1848, were proclaimed British subjects, their country placed under the government of an agent, and in 1871 it was joined to Cape Colony. In 1879 the attempted enforcement of an act passed for the disarmament of the native tribes caused a revolt under the chief Moirosi, which the Cape forces were unable to put down. When peace was restored Basutoland was disannexed from Cape Colony (1884), and is now governed by a resident commissioner under the High Commissioner for South Africa. Basutoland has an area of about 11,700 square miles, much of it covered with grass and there is but little wood. The climate is pleasant. Capital, Maseru. The chief products are wool, wheat, mealies, and Kaffir corn. The natives keep large herds of cattle. The revolt in Basutoland led by Masupha came to an end Feb. 1, 1898. In 1903 it became a member of the South African Customs Union. Pop. about 405,000.

BAT, the common name of all animals of the class mammalia which are furnished with true wings, and so are capable of really flying or propelling themselves in the air. Bats are now generally placed by naturalists in the order *cheiroptera*, although, like many other animals of that great order, most of them



LONG-EARED BAT

are by no means exclusively carnivorous. Upward of 130 species have been described, and there is great probability that the actual number existing is very much greater. Bats walk or creep awkwardly upon the ground, one side of the body being jerked forward, and then the other; yet they run with considerable celerity. Bats commonly produce one or two young at a birth. Fossil remains of *cheiroptera* are occasionally found in Eocene rocks.

BATANGAS (ba-tan'gas), a province on the S. coast of Luzon Island, Philippines; also the name of the capital of the province. The city has an excellent harbor, and prior to the war between the United States and Spain was the seat of a large commerce. The province is one of the richest sugar growing districts in the Philippines. It is also notable for its large production of cocoanut oil, the larger part of which is used for domestic purposes, chiefly lamp oil and lubricating machinery. Pop. of city about 40,000. Province: area, 1,108 square miles; pop. about 275,000.

BATAVIA, properly the name of the island occupied by the ancient Batavi, became at a later date the Latin name for Holland and the whole kingdom of the Netherlands. The name Batavian Republic was given to the Netherlands on their new organization, May 16, 1795, and they continued to bear it until they were converted into the kingdom of Holland, under Louis Bonaparte, June 8, 1806.

BATAVIA, a city and seaport of Java, on the N. coast of the island, the capital of all the Dutch East Indies. It is situated on a wide, deep bay, the principal warehouses and the offices of the Europeans being in the old town, which is built on a low, marshy plain near the sea and very unhealthful; while the Europeans reside in a much healthier quarter. Batavia has a large trade, sugar being the chief export. It was founded by the Dutch in 1619, and attained its greatest prosperity in the beginning of the 18th century. Its inhabitants are chiefly Malay. Pop. (1917) about 180,000 natives, about 30,000 Chinese, Arabs and other Orientals, and about 24,000 Europeans.

BATAVIA, a village and county-seat of Genesee co., N. Y., on the Tonawanda creek and several railroads; 37 miles E. of Buffalo. It is in an agricultural region; contains manufactories of ploughs and harvesters, carriage wheels, shoes, guns and forgings, and other industries; and has the State Institution for the Blind, the Dean Richmond Memorial Library, a National bank, daily and weekly newspapers. Pop. (1910) 11,613; (1920) 13,541.

BATCHELLER, GEORGE SHERMAN, an American jurist, born in Batchellerville, N. Y., July 25, 1837. He was graduated at Harvard University; was admitted to the bar in 1858; entered the Union Army at the beginning of the Civil War; was taken prisoner at Harper's Ferry, and exchanged in 1863; was then appointed Deputy Provost-Marshal-General of the Department of the South; and, in 1865-1870, was Inspector-General on the staff of Governor Fenton of New York. In 1858, 1872, and 1873 he was elected to the State Assembly; and, in 1875, was appointed one of the judges of the newly organized Supreme Court of Egypt for a term of five years. In 1883 he became President of the International Tribunal of Egypt; in 1889, Assistant Secretary of the United States Treasury; in 1890, United States Minister-Resident, and Consul-General to Portugal; and in 1897, again a member of the International Tribunal of Egypt. In the last year he received from King Humbert the decoration of the great cordon of the Order of the Crown of Italy, in recognition of his services as President of the Universal Postal Congress which met in Washington in May, 1897. He died July 2, 1908.

BATCHIAN, or **BATJAN**, one of the Moluccas, W. of the southern peninsula of the island of Gilolo. Area, 914 square miles; pop. about 13,000. It belongs to the Dutch residency of Ternate, consists of two peninsulas joined by a narrow isthmus, and has many mountains. Batchian produces gold, copper, much coal, sago, cocoanut trees, rice, cloves, and fine timber.

BATES, ARLO, an American author, born in East Machias, Me., Dec. 16, 1850. He graduated from Bowdoin in 1876, when he engaged in literary work in Boston, and afterward became Professor of English Literature in the Massachusetts Institute of Technology. He is author of poems and novels, including "The Pagans" (New York, 1884); "A Lad's Love"; "The Philistines" (1888); "Berries of the Brier" (1886), poems; "Talks on Writing English"; "Talks on the Study of Literature" (1897); "The Puritans"; "Under the Beech Tree"; "Diary of a Saint" (1902); "The Intoxicated Ghost" (1908); etc. He died in 1918.

BATES, BLANCHE, an American actress, born in Portland, Ore., in 1873. She removed in 1876 with her parents to San Francisco and was educated at the public schools at that city. Her first appearance on the stage was made in San Francisco in 1894 and in the following year she starred in "The Senator." After playing leading parts in various comedies, she appeared in Shakespearean rôles in Augustin Daly's Company in New York. She achieved great success in the title rôle of *Cigarette* in "Under Two Flags," and played the leading parts in "The Darling of the Gods" and "The Girl of the Golden West." In 1920 she appeared in "The Famous Mrs. Fair." In 1912 she married George Creel.

BATES, JOHN COALTER, an American military officer, born in St. Charles co., Mo., Aug. 26, 1842; educated at Washington University, St. Louis; entered the regular army as a Lieutenant in the 11th United States Infantry, May 14, 1861; served on the staff of General Meade from the battle of Gettysburg to the close of the war; promoted Captain, May 1, 1863; Major, May 6, 1882; and Colonel of the 2d United States Infantry, April 25, 1892. On May 4, 1898, he was appointed a Brigadier-General of Volunteers; on July 8 was promoted to Major General for his services in the Santiago campaign; on April 13, 1899, was honorably discharged under this commission, and on the same day was recommissioned a Brigadier-General of Volunteers. In February, 1899, he was appointed Military Governor of the province of Santa Clara, Cuba, and in April following was ordered to duty in the Philippines, where he several times greatly distinguished himself in the latter part of that year

and the early part of 1900. In March, 1900, he was assigned to the command of the department of southern Luzon; promoted Major-General (1902). In 1906 became chief of staff U. S. A. and retired same year with the rank of Lieutenant-General.

BATES, KATHARINE LEE, an American story writer, poet, and educator, born in Falmouth, Mass., Aug. 12, 1859; was called to the chair of English Literature in Wellesley College in 1891; edited collections of ballads, etc.; and wrote juvenile stories, including "Rose and Thorn" (1889); "The English Religious Drama" (1893); "The College Beautiful and Other Poems" (1887); "History of American Literature" (1898); "Spanish Highways and Byways" (1900); "Gretna Green to Land's End" (1907); "America the Beautiful" (1911); etc.

BATES, LINDON WALLACE, an American civil engineer, born in Marshfield, Vt., in 1858. He was educated at Yale University and became assistant engineer of the Northern Pacific and Oregon Pacific railways. This was followed by service as director of engineering and manager of various railway, dock and terminal contracts in Oregon, Washington, Montana, and other States. He was retained from 1896 to 1902 by the Belgian Government to prepare reports and projects for the improvement of the port of Antwerp. He was also consulting engineer on the enlargement of the Suez Canal and on rivers and harbors in Russia. He designed eight harbors for the Government of Queensland, Australia, and did important engineering work for the Government of South Australia. He built several large hydraulic dredges for the Russian, Australian and Indian Governments, and collaborated with other engineers in improving the port of Shanghai. He was contracting engineer on important work in Galveston, Tex., and designed the "Three Lake" Panama Canal. During the World War he served as vice-chairman of the Commission for Relief in Belgium and was chairman also of the engineering commission of the Submarine Defense Association. He was a member of several engineering societies and received many medals for his services in engineering.

BATES COLLEGE, a coeducational institution in Lewiston, Me.; organized in 1864, under the auspices of the Free Baptist Church; reported at the end of 1919: Professors and instructors, 40; students, 494; volumes of library, 47,000; endowment, over $1,000,000; number of graduates, 2,285; president, Rev. Clifton D. Gray.

BATH, city, port of entry, and county-seat of Sagadahoc co., Me., on the Kennebec river, and the Maine Central railroad; 12 miles from the ocean and 35 miles S. of Augusta. It is admirably situated as a commercial port; has regular steamboat connections with Boston and Augusta; is principally engaged in shipbuilding, both wood and iron; and has manufactories of brass and iron goods, oil cloth, shoes, and lumber. Bath has a large coastwise and foreign trade in ice, coal, lumber, hay, iron, and steel; and contains several National banks, public library, etc. Pop. (1910) 9,396; (1920) 14,731.

BATH, a city of England, in Somersetshire, on the Avon, which is navigable for barges from Bristol; is beautifully placed among the hills, and the houses are built of freestone, obtained from the neighborhood. The Abbey Church ranks as one of the finest specimens of perpendicular Gothic architecture. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day. Bath was founded by the Romans, and called by them *Aquæ Solis* (waters of the sun). Among the Roman remains discovered here have been some fine baths. The height of its prosperity was reached, however, in the 18th century, when Beau Nash was leader of the fashion and master of its ceremonies. Jointly with Wells it is the head of a diocese, and returns two members to the House of Commons. Pop. of municipal borough (1917) 58,799.

BATH HOUSES, MUNICIPAL. Baths for use of the public, under city control.

BATHOMETER, an instrument for measuring the depth of sea beneath a vessel without casting a line. It is based upon the fact that the attraction exerted upon any given mass of matter on the ship is less when she is afloat than ashore, because of the less density of sea water as compared with that of earth or rock.

BATHSHEBA, the wife of Uriah. David first committed adultery with her, then caused her husband to be slain, and afterward took her to wife. These sins displeased Jehovah, who sent the prophet Nathan to David, with the parable of the ewe lamb. David bitterly repented, but yet was punished. Bathsheba was the mother of Solomon, whose succession to the throne she took pains to secure. She is afterward mentioned in the history of Adonijah, in the title of

Psalm li, and among the ancestors of Christ (Matt. i: 6).

BATHS OF AGRIPPA, the earliest of the Roman thermæ; erected by Marcus Agrippa in the reign of Augustus. It stood in the Campus Martius, about 20 feet behind the Pantheon.

BATHS OF CARACALLA, one of the most magnificent of the Roman thermæ in the S. E. part of the city; 2,300 men could bathe in it at the same time. It was begun in 206 A. D. by Caracalla, and completed by Severus. The ruins which still remain are among the most remarkable in Rome.

BATHS OF DIOCLETIAN, the most extensive of the Roman thermæ; in the N. E. part of the city, and covering most of the ground between the Porto Collina and the Porta Viminalis. Over 3,000 persons could bathe in it at the same time. It contained a library, picture gallery, odeum, etc. Michael Angelo transformed the great hall of the Tepidarium into a nave for the Church of S. Marie degli Angeli. One of the laconica (hot rooms) forms the vestibule of the church.

BATHS OF TITUS, a structure on the Esquiline hill in Rome; built by the Emperor Titus. Considerable ruins are found N. E. of the Coliseum.

BATHURST ISLAND, on the north Australian coast, belonging to South Australia, separated from Melville Island by a narrow strait; triangular in shape, with a wooded area of about 1,000 square miles. Also an island in the Arctic Ocean, discovered by Parry, W. of Cornwallis and E. of Melville Island, 76° N., 100° W.

BATON ROUGE (-rözh), city, capital of the State of Louisiana and of East Baton Rouge parish; on the Mississippi river, and several railroads; 89 miles N. W. of New Orleans. It is built on a bluff on the E. bank of the river, and commands a fine view of the surrounding territory. Architecturally, it possesses much interest, because of the mixture of French and Spanish styles. The Capitol is a structure in the Elizabethan style, showing also Gothic windows and battlemented towers. Baton Rouge contains the State University, occupying the old United States Arsenal, the State Agricultural and Mechanical College, the State Asylum for the Deaf, Dumb and Blind, the State Penitentiary, an insane asylum, two orphans' homes, a collegiate institute, and other institutions. The city has National and State banks; several daily and weekly newspapers; and a large trade with the surrounding cotton and sugar growing regions. It was here, on Jan. 26, 1861, that the State Convention adopted the ordinance of secession; on May 7, 1862, the city was taken by the United States forces; on August 5, following, a determined Confederate attack was repulsed; and the city was held by the Union troops till the close of the war. Baton Rouge was the capital of the State from 1847 to 1864, when the seat of government was removed to New Orleans, but on March 1, 1882, it was again located in this city, where it has since remained. Pop. (1910) 14,897; (1920) 21,782.

BATOUM, or **BATUM** (ba-tom'), a port on the E. coast of the Black Sea, acquired by Russia by the Treaty of Berlin, on condition that its fortifications were dismantled and it was thrown open as a free port. It rapidly grew to be the main outlet for Transcaucasia; its harbor was enlarged for alleged commercial reasons; an arsenal was built outside it; it was connected by a military road with Kars; and, finally, in July, 1886, the Russian government declared it to be a free port no longer. As a result of the World War Batoum became part of the Republic of GEORGIA (*q. v.*). It is the capital of the province of the same name (area, 6,129 square versts; pop., about 123,000). The Allied Supreme Council, in April, 1920, internationalized it and made it the common outlet for Armenia, Azerbaijan, and Georgia. The city is the terminus of the Transcaucasian railway and of the petroleum pipe line from Baku and the principal center of export for petroleum from the Baku fields. Pop. about 25,000.

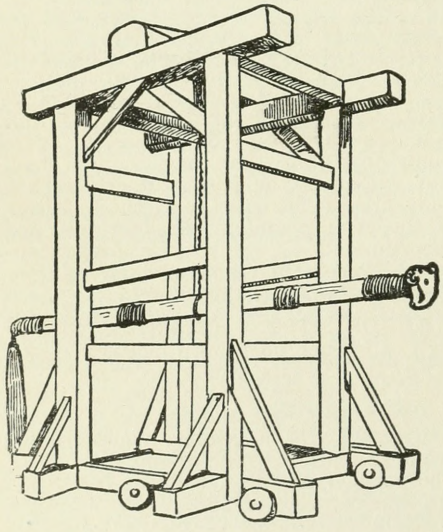
BATTALION, an assemblage of companies; the tactical and administrative unit of infantry—that is, the first body that is, as a rule, used independently, and commanded by a field officer (major or lieutenant-colonel).

BATTENBERG, name of a family conspicuous in British and Bulgarian history. The title Countess of Battenberg was conferred in 1851 on Prince Alexander of Hesse's morganatic spouse, the Countess Hauke (1825-1895). Fruits of that union were Prince Louis Alexander (born at Gratz, May 24, 1854; admiral British royal navy), who in 1884 married the eldest daughter of the Princess Alice; and in 1917 was created by royal decree Marquis of Milford Haven, dropped his former title of Prince of Battenberg, and, together with the other members of the British branch of the House of Battenberg, assumed the family name of Mountbatten; Prince Alexander (1857-1893) see below; and Prince

Henry Maurice (born at Milan, Oct. 5, 1858; died at sea of fever caught in the Ashanti war, Jan. 20, 1896), who in 1885 married the Princess Beatrice (born April 14, 1857), youngest daughter of Queen Victoria. Their eldest daughter, Princess Victoria Ena, in 1906, married Alfonso XIII., King of Spain.

The above Prince Alexander, chosen Prince of Bulgaria in 1879, proclaimed the union of Eastern Rumelia with Bulgaria (1885) without consulting Russia and thereby also provoked the jealousy of the Serbians, whom he defeated in a fortnight's campaign. But in August, 1886, partisans of Russia overpowered him in his palace at Sofia, forced him to abdicate, and carried him off to Reni, in Russian territory. Set free in a few days, he returned; but after a futile attempt to conciliate the Czar, he abdicated finally next month, and, assuming the title of Count Hartenau, retired to Darmstadt. He died Feb. 17, 1893.

BATTERING RAM, an ancient military contrivance used for battering down walls. It existed among the Assyrians. In its most perfect form among the



BATTERING RAM

Romans it consisted of a pole or beam of wood, sometimes as much as 80, 100, or even 120 feet in length. It was suspended by its extremities from a single point, or from two points in another beam above, which lay horizontally across two posts. When at rest it was level, like the beam above it. When put in action against a wall, it was swung horizontally by men who succeeded each other in constant relays, the blow which it gave to the masonry at each vibration being rendered all the more effective that one end of it was armed with iron. This, being generally formed like a ram's head, originated the name *aries* (ram), by which it was known among the Romans, and battering-ram, by which it was afterward known. A roof or shed covered it to protect the soldiers who worked it, from hostile missiles, and to facilitate locomotion it was often placed on wheels.

BATTERSEA, a metropolitan borough of Greater London, in Surrey, in a low situation on the S. bank of the Thames, nearly opposite Chelsea, with a fine public park extending over 185 acres. The district is associated with the names of Pope and Bolingbroke, and with the Wellington-Winchelsea duel. Pop. (1918) 149,951.

BATTERY, in law, the unlawful beating of another, or even the touching him with hostile intent. It is legitimate for a parent or a master to give moderate correction to his child, his scholar, or his apprentice.

In military usage, a certain number of artillerymen united under the command of a field officer, and the lowest tactical unit in the artillery. In a battery there are gunners who work the guns, and drivers who drive the horses by which these guns are transported from place to place.

BATTERY, in physics. See ELECTRICITY.

BATTIK, an ornamental production of the natives of the Dutch East Indies, who decorate their clothing with it; also made in The Hague for local use and export. A piece of linen is taken and all kinds of designs are outlined upon it with a pencil. When the design is completed, the ornamented parts of the fabric are covered with a liquid which possesses the quality of stiffening after being applied. The parts not ornamented are dyed the color desired. After the entire fabric has been ornamented in this manner, it is boiled in hot water so as to take the hard stuff out of the battik. The dyed parts will then hold the dye and the battik is ready. The Hague people were the first to introduce battik into Europe. It is made on linen, silk, velvet, and leather, and is exported to all the principal cities of Europe. In recent years the production of battik has been taken up in the United States to a much greater extent than ever.

BATTLE, a combat between two armies. In ancient times and the Middle

Ages, the battle ground was often chosen by agreement, and the battle was a mere trial of strength, a duel *en gros;* and, as the armies of the ancients were imperfectly organized, and the combatants fought very little at a distance, after the battle had begun maneuvers were much more difficult, and troops almost entirely beyond the control of the general. Under these circumstances, the battle depended almost wholly upon the previous arrangements and the valor of the troops. In modern times, however, the finest combinations, the most ingenious maneuvers, are rendered possible by the better organization of the armies, and it is the skill of the general rather than the courage of the soldier that now determines the event of a battle. Battles are distinguished as offensive or defensive on either side, but there is a natural and ready transition from one method to the other. As a rule, the purely defensive attitude is condemned by tacticians, except in cases where the only object desirable is to maintain a position of vital consequence, the weight of precedent being in favor of the dash and momentum of an attacking force, even where opposed to superior forces. Where the greatest generals have acted upon the defensive, it has almost always been with the desire to develop an opportunity to pass the offensive. Tacticians have divided a battle into three periods: those of disposition, combat, and the decisive moment.

BATTLE, a town in Sussex, England, 6 miles N. W. of Hastings. Encircled on three sides by wooded hills, it consists of one street, extending along a valley from N. W. to S. E. An uninhabited heathland then, Senlac by name, it received its present name from the battle of Hastings, fought here on Oct. 14, 1066, when the Normans, led by William the Conqueror, overthrew the old English monarchy under King Harold. William, to commemorate his victory, founded in 1067, on the spot where Harold fell, a splendid Benedictine Abbey, which was endowed with all the land within a league of it, and had the privileges of a sanctuary. Battle Abbey now consists of decorated and perpendicular buildings occupying three sides of a quadrangle—two sides in ruins, the third converted into a private dwelling-house.

BATTLE CREEK, a city in Calhoun co., Mich.; at the junction of Kalamazoo river and Battle creek, and on several railroads. It is an agricultural, fruit growing and sandstone quarrying region. It contains a college, the headquarters, and the publishing house of the Seventh-Day Adventists; Battle Creek Medical College; division offices of the Grand Trunk railway; and one of the largest sanitariums in the world. The city is an attractive summer resort, with more than 75 lakes in its immediate vicinity. In recent years it has become important as a manufacturing city. Its cereal foods have now an international reputation. Pop. (1910) 25,267; (1920) 36,164.

BATTLEDORE AND SHUTTLECOCK. See BADMINTON.

BATTLEMENT. (1) A wall or rampart built around the top of a fortified building, with interstices or embrasures to discharge arrows or darts, or fire guns through. (2) A similar erection around the roofs of churches and other Gothic buildings, where the object was principally ornamental. They are found not only upon parapets, but as ornaments on the transoms of windows, etc. (3) A wall built around a flat-roofed house, in the East and elsewhere, to prevent any one from falling into the street, area or garden.

BATTLESHIP, a warship of the heaviest class, designed for fighting in line of battle. The modern battleship is the great fighting unit in a fleet engagement, designed to stand to her work and take the hardest of blows and to overcome any ship that may oppose her. Her armor is the least vulnerable, her guns are the heaviest, and the qualities of the cruiser and armored cruiser are subordinated to secure this preponderance of protection and armament. See NAVY; NAVY, UNITED STATES.

BAUDELAIRE, CHARLES (bōd-lār'), a French poet, born in Paris, April 21, 1821. In his youth he traveled to India, and is said to have likewise visited the Mauritius and Madagascar. On his return to Paris he became a notable figure in the second group of romantic poets who carried on the movement begun by the Romanticists of 1830. His "Flowers of Evil," a volume of poems issued in 1857, was the subject of a prosecution on the score of immorality. He afterward published "Artificial Paradises," containing selections from Poe and De Quincey, besides original material. His occasional essays, collected in a volume entitled "Romanesque Art," are remarkable for the finish of the style and the subtlety of the criticism. Apart from his verse, however, Baudelaire's finest work is contained in his 50 "Little Poems in Prose." He died in Paris Aug. 31, 1867.

BAUER, HAROLD, an English pianist, born in London in 1873. He learned to play the violin from his father and afterward studied under several German masters. His first successful tour was made in 1883 when he was ten years of age. His success continued thereafter. He studied under Paderewski for one year, and in 1893 made a tour through Russia and other European countries. In 1900 he came to the United States, where he was received with success similar to that which had greeted him in Europe. He continued to make annual tours in the United States.

BAUHINIA (named by Blumier after John and Caspar Bauhin, the plants which have two-lobed leaves being deemed suitable for rendering honor to two brothers, instead of to one person simply), mountain ebony, a genus of plants belonging to the order *fabaceæ*, or *leguminosæ*, and the sub-order *cæsalpinieæ*. The species, which are mostly climbers, belonging to the East or West Indies, have beautiful flowers.

BAUM, (LYMAN) FRANK, an American author, born in 1856 in Chittenango, N. Y. He received an academic education, entered the newspaper field, and for several years edited papers in Chicago and elsewhere. He was best known as a writer for children. "The Wizard of Oz," a musical comedy made from one of his books, had a run of several years in New York and Chicago. Other works include "Mother Goose in Prose" (1897); "Baum's Fairy Tales" (1908); "Patchwork Girl of Oz" (1913). He died in 1920.

BAUMBACH, RUDOLF (boum'bäch), a German poet, born at Kranichfeld, Saxe-Meiningen, Sept. 28, 1840. After studying natural science in Würzburg, Leipsic, Freiburg, and Heidelberg, he lived as a tutor in Austria, last at Trieste, where he devoted himself afterward exclusively to writing. In 1885 he returned to Meiningen. He has most successfully cultivated the poetical tale, based upon ancient popular legends. Epics: "Zlatorog," a Slovenic Alpine legend (1875); "Horand and Hilda" (1879); Lyrics: "Songs of a Traveling Journeyman" (1878); "Minstrel's Songs" (1882); "Traveling Songs from the Alps" (1883); "Jug and Inkstand" (1887); "Thuringian Songs" (1891). He is also author of "False Gold" (1878), a historical romance; "Summer Legends" (1881); "Once Upon a Time" (1889); etc. He died in 1905.

BAUTZEN (Wendish *Budissin*), an important manufacturing town in Saxony, situated on a rising ground overlooking the river Spree, 35 miles W. of Görlitz by rail. It is the chief town of an administrative district of the same name. Pop. about 50,000. The chief buildings are a former cathedral (1497), and the Castle of Ortenburg, dating from 958, and a frequent residence of the Kings of Bohemia. The leading industries are manufactures of woolens, fustian, linen, hosiery, leather, and gunpowder. Bautzen was first made a town under Otho I. It suffered greatly in the war with Hussites, and still more during the Thirty Years' War. Here Napoleon won a barren victory over Russians and Prussians, May 20-21, 1813.

BAUXITE, a mineral which occurs in round, concretionary disseminated grains; is found extensively in France and other parts of Europe, and, in the United States, principally in Alabama and Georgia. The purest bauxite is called aluminum ore, because commercial aluminum is made from it. Beds of this mineral have been discovered in Alabama, Arkansas, and Georgia, and now that aluminum has been introduced rapidly into many of the economic arts, the mining of bauxite bids fair to become the basis for important industries in the Southern States. In Alabama the deposits known as the Cherokee and Calhoun, are near Jacksonville, and are hard on the outcrops, but after being cut into become soft and crumbly. White, gray, and red are the principal colors. In Arkansas the ore is found in Saline and Pulaski counties, and in the Little Rock region some veins are estimated to be 20 feet thick. The deposits are red, black, and cream colored, the first two predominating. In Georgia, the counties of Floyd, Polk, and Bartow, which are adjacent to the Alabama deposits, have been shown by government surveys to be rich in the ore, and experts agree that these counties and Cherokee, Calhoun, and Cleburne counties in Alabama, are almost wholly underlaid with beds, practically inexhaustible.

BAVARIA, a state in southern Germany and the second largest state of Germany, composed of two isolated portions, the larger having Czecho-Slovakia on the E., the Republic of Austria on the E. and S., and Württemberg, Baden, etc., on the W., while the smaller portion, the Pfalz or Palatinate, is separated from the other by Württemberg and Baden, and lies W. of the Rhine; total area, 30,562 square miles. Pop. about 7,000,000. After Munich, the capital, the chief towns are Nürnberg, Augsburg, Würzburg, Ludwigshafen, and Ratisbon (Regensburg).

Topography.—The main portion of the kingdom is in most parts hilly; in the S., where it belongs to the Alps, mountainous; but N. of the Alps and S. of the Danube, which flows E., through the country from Ulm to Passau, there is a considerable plateau, averaging about 1,600 feet above the sea level. The S. frontier is formed by a branch of the Noric Alps, offsets from which project far into the plateau; principal peaks: the Zugspitze, 10,394 feet, and the Watzmann, 9,470 feet. The highest summits on the Bohemian (Austrian) frontier, belonging to the Böhmerwald Mountains, are the Rachel, 5,102 feet, and the Arber, 5,185 feet. Ranges of less elevation bordering on or belonging to the country are the Fichtelgebirge in the N. E., the Frankenwald, Rhöngebirge, and Spessart in the N., and the Steigerwald and Franconian Jura in the middle. The Palatinate is traversed by the N. extremity of the Vosges Mountains, the highest peak being the Königstuhl, 2,162 feet. The greater part of the country belongs to the basin of the Danube, which is navigable, its tributaries on the S. being the Iller, Lech, Isar, and Inn; on the N., the Wörnitz, Altmühl, Nab, and Regen. The N. portion belongs to the basin of the Main, which receives the Regnitz and Saale, and is a tributary of the Rhine. The Palatinate has only small streams that flow into its boundary river, the Rhine. The chief lakes of Bavaria are all on the higher part of the S. plateau; the smaller within the range of the Alps. The Ammer-See is about 10 miles long by 2½ broad, 1,736 feet above the sea; the Würm-See or Starnberger-See, about 12 miles long by 3 broad, 1,899 feet; and Chiem-See, 9 miles long by 9 to 4 broad, 1,651 feet. The climate in general is temperate and healthful, though somewhat colder than the other south German states; the yearly average temperature is about 47°.

Soil and Productions.—As regards soil Bavaria is one of the most fertile countries in Germany, producing the various cereals in abundance, the best hops in Germany, fruit, wine, tobacco, etc., and having extensive forests. Lower Franconia (the Main valley) and the Palatinate are the great vine growing districts. The celebrated Steinwein and Leistenwein are the produce of the slopes of the Steinberg and Marienberg at Würzburg (on the Main). The forests of Bavaria, chiefly fir and pine, yield a large revenue; much timber being annually exported, together with potash, tar, turpentine, etc. The principal mineral products are salt, coal, and iron, some of the mining works belonging to the state. The minerals worked include copper, quicksilver, manganese, cobalt, porcelain clay, alabaster, graphite. Large numbers of horses and cattle are reared, as also sheep and swine.

Manufactures.—The principal articles manufactured are linens, woolens, cottons, leather, paper, glass, earthen and iron ware, jewelry, etc. The optical and mathematical instruments made are excellent. A most important branch of industry is the brewing of beer, for which there are upward of 7,000 establishments producing over 260,000,000 of gallons a year. Principal exports: corn, timber, wine, cattle, glass, hops, fruit, beer, wooden wares, etc. From its position Bavaria has a considerable transit trade. The König Ludwig canal connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing water communication between the German Ocean and the Black Sea.

Education.—Before the European War there were over 7,500 elementary schools, on which attendance is compulsory up to 14 years of age. There are three universities, two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. In art Bavaria is best known as the home of the Nürnberg school, founded about the middle of the 16th century by Albert Dürer. Hans Holbein is also claimed as a Bavarian; and to these have to be added the eminent sculptors, Kraft and Vischer, both born about the middle of the 15th century. The restoration of the reputation of Bavaria in art was chiefly the work of Ludwig I., under whom the capital became one of the most prominent seats of the fine arts in Europe. The religion of the state was Roman Catholicism. All citizens, whatever their creed, possess the same civil and political rights. The dioceses of Bavaria comprise two Roman Catholic archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstädt, Passau, Würzburg, and Spires.

Government.—Under the monarchial form of government the Bavarian crown was hereditary in the male line. The executive was in the hands of the King. The Legislature consisted of two chambers, one of Senators: royal princes, high state officers, clergy, etc.; the other of 150 deputies nominated by electors. Bavaria sent six members to the German Federal Council (Bundesrath), and 48 to the Reichstag. In times of peace the King of Bavaria commanded the army, but in war the German Emperor commanded. As a result of the new consti-

tution, adopted on Aug. 14, 1919, Bavaria became a free state, with universal, equal, direct, secret and proportional suffrage. There is one Chamber, elected for 4 years, one member for every 40,000 inhabitants. The supreme power lies with the people and is exercised by the Cabinet as a whole. The church is separated from the state.

History.—The Bavarians take their name from the Boii, a Celtic tribe whose territory was occupied by a confederation of Germanic tribes, called after their predecessors, Boiarii. These were made tributary first to the Ostrogoths, and then to the Franks; and on the death of Charlemagne his successors governed the country by lieutenants, with the title of Margrave, afterward converted (in 921) into that of Duke. In 1070 Bavaria passed to the family of the Guelphs, and in 1180 by imperial grant to Otho, Count of Wittelsbach, founder of the dynasty that reigned until 1918. In 1623 the Duke was made one of the Electors of the Empire. Elector Maximilian II. joined in the war of the Spanish succession on the side of France, and this led, after the battle of Blenheim, 1704, to the loss of his dominions for the next 10 years. His son, Charles Albert, likewise lost his dominions for a time to Austria, but they were all recovered again by Charles' son, Maximilian III. (1745). In the wars following the French Revolution, Bavaria was in a difficult position between France and Austria, but latterly joined Napoleon, from whom its Elector, Maximilian IV., received the title of King (1805), a title afterward confirmed by the treaties of 1814 and 1815. King Maximilian I. was succeeded by his son, Ludwig (or Louis) I., under whom various circumstances helped to quicken a desire for political change. Reform being refused, tumults arose in 1848, and Ludwig resigned in favor of his son, Maximilian II., under whom certain modifications of the constitution were carried out. At his death in 1864, he was succeeded by Ludwig II. In the war of 1866, Bavaria sided with Austria, and was compelled to cede a small portion of its territory to Prussia, and to pay a war indemnity of $12,500,000. Soon after, Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein. In the Franco-Prussian War of 1870-1871, the Bavarians took a prominent part, and it was at the request of the King of Bavaria, on behalf of all the other princes and the Senates of the free cities of Germany, that the King of Prussia agreed to accept the title of Emperor of Germany. Since January, 1871, Bavaria has been a part of the German Empire. The eccentricity early displayed by Ludwig II. developed to such an extent that in June, 1886, he was placed under control, and a regency established under Prince Luitpold. The change was almost immediately followed by the suicide of the King, and as Prince Otto, the brother and heir of the late King, was insane, his uncle Luitpold became regent. His son Louis succeeded him December, 1912, and was proclaimed King as Ludwig III. in 1913. In November, 1918, a revolutionary uprising forced Ludwig to abdicate and Bavaria became a republic.

BAX, ERNEST BELFORT, an English socialist, born in Leamington, July 23, 1854; was educated in London and Germany; followed journalism in Germany as foreign correspondent in 1880-1881; and returning to England, became one of the founders of the English socialist movement. In 1885 he aided in starting the Socialist League. Subsequently, he resigned from the league and joined the Social Democratic Federation, and for a time also edited its organ, "Justice." His publications include "Jean-Paul Marat" (1878); "Kant's Prolegomena, etc." (1882); "Religion of Socialism" (1886); "Ethics of Socialism" (1889); "French Revolution" (1890); "Outlooks from the New Standpoint" (1891); "The Problem of Reality" (1893); "German Society at the Close of the Middle Ages" (1894); "Outspoken Essays on Social Subjects" (1897); "The Peasants' War in Germany" (1899); "Impressions and Reflections" (1918); etc.

BAXTER, RICHARD, an English Nonconformist preacher and theological writer, born in Shropshire in 1615. He early entered the Church, and, taking sides with the Parliamentary party, became chaplain to one of the regiments of the Commonwealth, accompanying the troops in every conflict in the Civil War. It was while so employed that he wrote his first book, the "Saint's Rest." The Restoration and the Act of Conformity drove Baxter into retirement, and shut him out of the pulpit, during which time he wrote his second book, "The Call." After much persecution, he, then 70 years old, was brought before Judge Jeffreys, who fined him £500, with imprisonment till paid. His most popular books are the "Saint's Everlasting Rest," "Dying Thoughts," and "Call to the Unconverted." His theological views are set forth in the "Methodus Theologiæ," and "Catholic Theology"; and he has left an account of his life in the "Reliquiæ Baxterianæ." He died Dec. 8, 1691.

BAY, an arm or inlet of the sea extending into the land, with a wider mouth proportionally than a gulf. Compare in this respect the Bay of Biscay with the Gulf of Venice.

In hydraulics: a pond-head raised to keep a store of water for driving a mill.

In architecture: a term used to signify the magnitude of a building. Thus, if a barn consists of a floor and two heads, where they lay corn, they call it a barn of two bays. These bays are from 14 to 20 feet long, and floors from 10 to 12 broad, and usually 20 feet long, which is the breadth of the barn.

BAYADERE, a name originally given by the Portuguese to the singing and dancing girls of Hindustan. They are of two kinds—those who are employed as priestesses in the temples, and those who go about the country as itinerants. The former class celebrate with song and dance the festivals of the gods; the latter are employed by the grandees of India to amuse them.

BAYAMO, or SAN SALVADOR, a town in the interior of the E. part of the island of Cuba, situated in a fertile and healthy district on the northern slope of the Sierra Maestra. It is connected by a railway with Manzanilla. Pop. about 5,000.

BAYARD, PIERRE DU TERRAIL, SEIGNEUR DE (bī-yär'), the *Bon Chevalier sans Peur et sans Reproche* (good knight without fear and without reproach), and from whom is derived the proverbial saying, "Brave as Bayard," was born in 1476, of an ancient and noble French family of Dauphiné. He early displayed the indomitable resolution, courage, military skill, and honor which made him the model of knighthood, and caused his sovereign, Francis I., to covet as an honor the ceremony of being dubbed a knight by his hands. Bayard, at 13 years old, was placed as a page in the house of the Duke of Savoy, where he remained for five years. On the completion of his 18th year he became a soldier. The first battle at which he fought was that of Fornovo, in 1494, under the banner of Charles VIII., when he distinguished himself. He fought in the Italian wars of Louis XII. and once held a bridge single-handed enabling the French to retreat. In 1513 he fought at the famous battle of the Spurs, in Picardy, where his valor saved the disgrace of the whole French army. On this occasion Bayard surrendered to an English knight, but was soon exchanged. In the battle of Marignano, fought Sept. 13, 1515, Bayard displayed his usual prowess; and in 1521 he defended Mézières, a frontier town of France, against the Count of Nassau, with a force of 35,000 men. Bayard was as conspicuous for military skill as for bravery; but lacking the arts of the courtier, he was never appointed to the command of armies. Nevertheless, in moments of danger and difficulty, he was always looked up to for advice. In 1524, he served under Admiral Bonnivet in Italy against the Imperialists under the Constable de Bourbon, and at the passage of the Sesia received his mortal wound. He refused to be carried off the field saying he would not then, for the first time, turn his back on the enemy. Reclining at the foot of a tree, he still urged on his comrades. The Constable coming up was affected at the sight, and the noble Bayard, with almost his last breath, is said to have uttered the rebuke, "It is not me you should mourn for, but yourself fighting against your King and your country," after which he died. His life was written by his loyal serviteur, or secretary, and has passed through many editions.

BAYARD, THOMAS FRANCIS, an American statesman and diplomatist, born in Wilmington, Del., Oct. 29, 1828. He came of a family which for four successive generations represented the State of Delaware in the United States Senate. The first of his ancestors to settle in that State was Peter, a son of Petrus Bayard, probably a collateral descendant of the celebrated Chevalier Bayard and Anne C. Stuyvesant, the latter a sister of Peter Stuyvesant, the last of the Dutch Governors of New Netherlands. Mr. Bayard's great-grandfather, Richard Bassett, was a member of the convention that framed the Constitution of the United States. Mr. Bayard was admitted to the bar in 1851 and practiced law until 1868, when he succeeded his father, James A. Bayard, in the United States Senate. In the Democratic National Convention of 1872 he received 15 votes for the presidential nomination, and in the convention of 1876, 31 votes, which he turned over to Samuel J. Tilden. In 1880 and again in 1884 his name was voted on in the National convention of his party. In 1885 he was chosen by President Cleveland as Secretary of State, and on Cleveland's second election, in 1892, he was appointed United States Ambassador to the Court of St. James, being the first to bear that title. While holding this high office he won many friends by his personal charm of manner, and his public utterances promoted good feeling in both social and government circles. He died in Dedham, Mass., Sept. 28, 1898.

BAYAZID. See BAJAZET.

BAY CITY, city and county-seat of Bay co., Mich.; on the Saginaw river and several railroads; 13 miles N. of Saginaw. It is noted for its large shipbuilding plants and its extensive trade in lumber, coal, and manufactured products. The city is the farming, lumbering, and mining trade and wholesale center for northern Michigan; has National banks, a number of imposing public buildings, including the United States Government Building, City Hall, Masonic Temple, and the First Presbyterian Church. Bay City and West Bay City, which have many trade, manufacturing, and financial interests in common, were consolidated in 1905. Pop. (1910) 45,166; (1920) 47,554.

BAYERN. See BAVARIA.

BAYEUX (bī-ē'), an ancient city of Normandy, in the French department of Calvados, on the Aure, 15 miles N. W. of Caen. Many of the houses are built of wood, and the streets have a forlorn and decayed appearance. The Gothic cathedral—the oldest, it is said, in Normandy—was rebuilt after a fire by William the Conqueror, in 1077; but the present edifice dates mainly from 1106 to the 13th century. The W. front, with its two 12th century steeples, and the three sculptured porches, are notable features. Porcelain and lace are manufactured.

BAY ISLANDS, a small group in the Bay of Honduras, 150 miles S. E. of Balize. The cluster was proclaimed a British colony in 1852, but in 1859 they were ceded to the Republic of Honduras. The chief of the six islands are Roatan (30 by 9 miles; 900 feet high), and Guanaja, whence, in 1502, Columbus first sighted the mainland of America.

BAY LAKE, a body of water in the northern part of Luzon, Philippine Islands. This lake is connected with Manila Bay by the Pasig river, and from its center rises a high volcanic island. Bay Lake is about 20 miles in extent from N. to S., and about 47 miles from E. to W.

BAYLE (bāl), **PIERRE**, a French critic and writer, the son of a Calvinist preacher, born at Carlat (Languedoc) in 1647; studied at Toulouse. He went to Paris in 1674, and was appointed Professor of Philosophy at Sedan. Six years after he removed to Rotterdam, where he filled a similar chair. The appearance of a comet, in 1680, induced him to publish, in 1682, his "Pensées Diverses sur la Comète," a work full of learning. It was followed by his "Critique Générale de l'Histoire du Calvinisme de Maimbourg." In 1684 he undertook a periodical work, "Nouvelles de la République des Lettres," containing notices of new books in theology, philosophy, history, and general literature. In 1693 Jurieu, a jealous theologian, succeeded in inducing the magistrates of Rotterdan to remove Bayle from his office. He now devoted all his attention to the composition of his "Dictionnaire Historique et Critique," which he first published in 1696. It is a vast storehouse of facts, discussions and opinions, and though it was publicly censured by the Rotterdam consistory for its frequent impurities, its pervading scepticism, and tacit atheism, it long remained a favorite book both with literary men and with men of the world. The best editions are that of 1740, in four volumes folio (Amsterdam and Leyden), and that in 16 volumes, published in 1820-1824, at Paris. He died in Rotterdam, in 1706.

BAYLEN, or **BAILEN**, a town of Spain, province of Jaen, at the foot of the Sierra Morena, 22 miles N. of Jaen. It commands the road leading from Castile into Andalusia, and derives its celebrity from the events which took place in its vicinity leading to the "Capitulation of Baylen," signed July 20, 1808, when General Dupont, and about 20,000 French troops under his command, surrendered to the Spaniards on condition of their being conveyed to France by the Spanish Government; but the latter stipulation was not carried into effect.

BAYLEY, JAMES ROOSEVELT, an American theologian, born in New York City, Aug. 23, 1814; studied at Trinity College, Hartford, and became minister of the Protestant Episcopal Church; but, in 1842, was converted to the Roman Catholic faith; and, after studying at Paris and Rome, became a priest in 1844. He accepted the Chair of Belles-Lettres at St. John's College, Fordham, and was its acting president in 1846. After serving as secretary to Archbishop Hughes, he was consecrated the first Bishop of Newark, N. J., in 1853. In 1872 he became Archbishop of Baltimore, Md. He was the founder of Seton Hall College and several other institutions. His "Pastorals for the People," and "History of the Catholic Church on the Island of New York," are his chief writings. He died in Newark, N. J., Oct. 3, 1877.

BAYLOR UNIVERSITY, a coeducational institution in Waco, Tex., founded in 1845, under the auspices of the Baptist Church; reported at the end of 1919: Professors and instructors, 56; students, 1,124; volumes in the library,

37,900; income, $293,571; number of graduates, 1,945; president, Samuel Palmer Brooks, LL. D.

BAY OF ISLANDS, a large, deep and safe harbor on the N. E. coast of the North Island of New Zealand. On it is Kororarika, the first European settlement in New Zealand. Also a large bay formed by the Gulf of St. Lawrence, on the W. coast of Newfoundland.

BAYONET, a miltary weapon formerly called a dagger, made to be fitted to the muzzle of a gun or rifle, to convert the latter into a kind of pike. At first it was so fixed that it required to be taken off before the gun was fired; but since the battle of Killiecrankie showed the danger of such an arrangement, it has been fastened on in such a way as not to interfere with the firing of the weapon. See INFANTRY.

BAYONNE, a city in Hudson co., N. J., on New York harbor, the Kill von Kull, and Newark Bay, and the Central of New Jersey and the Lehigh Valley railroads; 7 miles S. W. of New York City. The city is also on the Hudson County Boulevard and the Morris canal. It contains a number of former villages; and is principally engaged in coal shipping and petroleum refining, the works for the latter being connected by pipe lines with New York, Philadelphia, Baltimore, Pittsburgh, and other cities. Other noteworthy industries are the manufactures of chemicals, ammonia and colors. The residential part of the city is very attractive, containing fine homes of New York business men, and having trolley connection with Jersey City, Newark, and the Oranges. Pop. (1910) 55,545; (1920) 76,754.

BAYONNE, a strongly fortified seaport of France, in the department of Basses-Pyrénées, capital of an *arrondissement;* at the confluence of the Nive with the Adour, and 58 miles W. N. W. of Pau. It is a first-class fortress, the citadel, one of the finest works of Vauban, commands the town and harbor. A mint is established here. Chocolate, liqueurs, glass, sugar, etc., are manufactured. There are also extensive yards for the building of ships of war and merchant vessels. The hams of Bayonne have long enjoyed a high celebrity. The military weapon called the bayonet takes its name from this city, where it is said to have been first invented and brought into use during the siege of 1523. Though often besieged, Bayonne has never been taken; and hence its motto, *"Nunquam Polluta."* It was invested by the British, Feb. 24, 1814. Pop. about 27,500.

BAYREUTH, or **BAIREUTH**, a city in the northeastern part of Bavaria, on the Red Main, 40 miles N. N. E. of Nuremberg (Lat. *Baruthum*), celebrated for its associations with the unhappy Wilhelmina, Margravine of Bayreuth and sister of Frederick the Great, with Jean Paul Frederick Richter, and with Richard Wagner, who at length found here the opportunity to bring out his operas. Wagner festivals are annual features and are held in the world-famous Wagner theater. It contains many fine structures, and some elegant residences near by. Villa Wahnfried, the former home of Wagner, has spacious grounds, which contain the composer's mausoleum. It has a good and varied manufacturing business. It was nearly destroyed in 1553 by Reuss and suffered greatly in the Thirty Years' War. Pop. about 35,000.

BAY RUM, an aromatic, spirituous liquid, used by hair dressers and perfumers, prepared in the West Indies by distilling rum in which bay leaves have been steeped. Genuine bay rum is difficult to obtain except through importers.

BAZA (bä'tha), an old town of Spain, Andalusia, province of Granada, formerly a large and flourishing city. In 1810 the French, under Marshal Soult, here defeated the Spaniards under Generals Blake and Freire.

BAZAINE, FRANÇOIS ACHILLE (ba-zān), a French military officer, born in Versailles, Feb. 13, 1811. He served in Algeria, in Spain against the Carlists, in the Crimean War, and joined the Mexican expedition as general of division in 1862, and, in 1864, was made a marshal of France. He commanded the 3d Army Corps in the Franco-Prussian War, when he capitulated at Metz, after a seven weeks' siege, with an army of 175,000 men. For this act he was tried by court-martial in 1871, found guilty of treason, and condemned to death. This sentence was commuted to 20 years' seclusion in the Isle St. Marguerite, from which he escaped, and retired to Spain. He died in Madrid, Sept. 28, 1888. His widow, who had clung faithfully to him in his adversity and had plotted successfully for his escape, died in Mexico City, Jan. 8, 1900.

BEACH, ALFRED ELY, an American publisher and inventor, born in Springfield, Mass., in 1826; son of Moses Yale Beach, editor of the old New York "Sun." In 1846 he established the "Scientific American," in connection with Orson D. Munn. For nearly 50 years

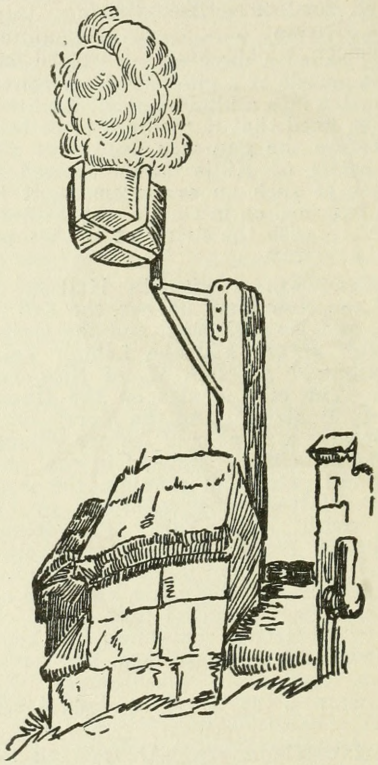
he was editor of this paper and director of its patent business. In 1852 he perfected a typewriting machine, for which the American Institute awarded him a gold medal. Later he invented a system of underground pneumatic tubes, a pneumatic elevated railway, and a hydraulic shield, by the use of which a tunnel could be excavated without interfering with surface traffic. He died in New York City, Jan. 1, 1896.

BEACH, HARLAN PAGE, an American educator and missionary, born in South Orange, N. J., in 1854. He graduated from Yale University in 1878. For several years he taught at Phillips Andover Academy and then engaged in work in China as a missionary, serving until 1890. From 1892 to 1895 he was in charge of the School for Christian Workers in Springfield, Mass., and from 1895 was educational secretary of the Student Volunteer Movement for Foreign Missions. From 1906 he was professor of the theory and practice of missions at Yale University. He wrote much on missionary and other subjects. His works include "The Cross in the Land of the Trident" (1895); "India and Christian Opportunity" (1904); "World Statistics of Christian Missions" (1906); etc. He contributed articles to magazines on religious subjects.

BEACH, REX (ELLINGWOOD), an American writer, born in Atwood, Mich., in 1877. He was educated at Rollins College, Fla., and studied law at the Chicago College of Law. His first novel was "Pardners," published in 1905. This was followed by a succession of novels, nearly all of which achieved great popular success. They include "The Spoilers" (1906); "The Silver Horde" (1909); "The Iron Trail" (1913); "Rainbow's End" (1916). He also wrote, in collaboration with others, several plays and was a frequent contributor to magazines. In 1917 and 1918 he was president of the Authors' League of America.

BEACHY HEAD, a promontory in the S. of England, on the S. coast of Sussex, rising 575 feet above sea-level, with a revolving light, visible in clear weather from a distance of 28 miles. A naval battle took place here, June 30, 1690, in which a French fleet under Tourville defeated an English and Dutch combined fleet under Lord Torrington.

BEACON, a signal fire; a bale fire; a light placed on an eminence to announce the approach of an enemy, and arouse up the country. Beacon fires are of great antiquity, being referred to in Scripture (Jer. vi: 1), and were used by the Greeks and Romans. The intelligence of the capture of Troy is represented by Æschylus as having been conveyed to the Peloponnesus by signals of this kind. In England, the beacons were formerly piles of faggot wood, but afterward poles were erected, to which iron pots were



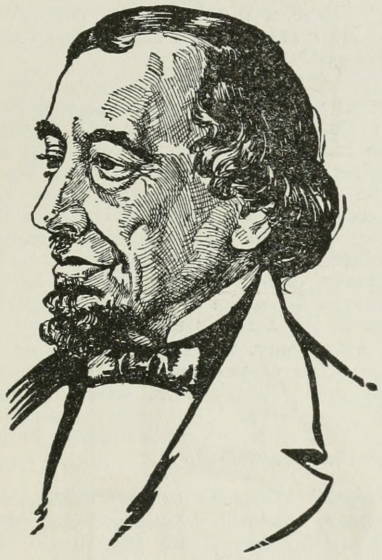
ANCIENT BEACON SIGNAL TOWER

attached, filled with pitch and other combustibles. Intelligence was quickly conveyed in this manner.

A beacon is also an erection placed at the entrance of a bar, river, or harbor, to indicate dangerous navigation, as sunken rocks, sand banks, etc. Vessels anchored in certain places, exhibiting lights at night, are called floating beacons, floating lights, or lightships.

BEACON, a city of New York, created in 1913 by the consolidation of Fishkill Landing and Matteawan, in Dutchess co. There is a hospital, a public library, and several academies. The industries include the manufacture of hats, tools, machinery, etc. Beacon was the first city in the State to adopt the commission form of government. Pop. (1910) 10,629; (1920) 10,996.

BEACONSFIELD, BENJAMIN DISRAELI, EARL OF, an English statesman and novelist, of Jewish extraction; eldest son of Isaac D'Israeli, author of the "Curiosities of Literature"; born in London, Dec. 21, 1804. He attended for a time a private school, and was first destined for the law, but turned to literature. In 1826 he published "Vivian Grey," his first novel; and subsequently traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterward reproduced in his books. In 1831 "The Young Duke" appeared, followed by "Contarini Fleming," "Alroy," "Henrietta Temple," "Venetia," "The Revolutionary Epic" (a poem), etc. In 1832, and on two subsequent occasions, he appeared as candidate for the representation of High Wycombe, but was unsuccessful. In 1835 he unsuccessfully contested Taunton as a Tory. In 1837 he gained an entrance to the House of Commons, being elected for Maidstone. His first speech in the House was treated with ridicule; but he finished with the prophetic declaration that the time would come when they would hear him. During his first years in Parliament, he was a supporter of Peel; but when Peel pledged himself to abolish the corn laws, Disraeli became the leader of the Protectionists. About this time he became a leader of what was known as the Young England party, the most prominent characteristic of which was a sort of sentimental advocacy of feudalism. This spirit showed itself in his two novels of "Coningsby" and "Sybil," published respectively in 1844 and 1845. Having acquired the manor of Hughenden, in Buckinghamshire, he was in 1847 elected for this county, and he retained his seat till raised to the peerage, nearly 30 years later. His first appointment to office was in 1852, when he became Chancellor of the Exchequer under Lord Derby. The following year, however, the ministry was defeated. He remained out of office till 1858, when he again became Chancellor of the Exchequer, and brought in a reform bill which wrecked the government. During the time the Palmerston government was in office, Mr. Disraeli led the opposition in the lower House. In 1866 the Liberals resigned, and Derby and Disraeli came into power, the latter being again Chancellor of the Exchequer. They immediately brought in, and carried, after a violent struggle, a reform bill, on the basis of household suffrage. In 1868, he became Premier on the resignation of Lord Derby, but his tenure of office was short. In 1874 he again became Prime Minister with a strong Conservative majority, and he remained in power for six years. This period was marked by his elevation to the peerage, in 1876, as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern Question and the conclusion of the Treaty of Berlin in 1878. In 1880, Parliament was rather suddenly dissolved, and the new Parliament showing an overwhelming Liberal majority, he resigned at once. Within a few months of his death, in London, April 19, 1891, the publication of a novel "Endymion" showed that his intellect was still vigorous. He also wrote "A Vindication of the English Constitution" (1834); "Alarcos, a Tragedy" (1839); "Lothair" (1881); and "Lord George Bentinck, a Political Biography" (1852).



LORD BEACONSFIELD

BEAGLE ISLAND, an island discovered by Admiral Fitzroy, during a voyage in the "Beagle," to survey Patagonia, in 1828-1834. The channel of the same name is on the S. side of the island of Tierra del Fuego.

BEAN, a well known cultivated plant, *vicia faba,* of Linnæus, now called *faba vulgaris.* It belongs to the order *leguminosæ.* The flowers, which are fragrant, are papilionaceous, white, with violet colored veins and blotches, looking almost black. The seeds are partly kidney-shaped. The native country of *faba vulgaris* is believed to be the regions near the Caspian Sea, the Levant, and Egypt. *Faba vulgaris* may be primarily

divided into the garden bean and the field bean. Of the former, there are numerous sub-varieties. The earliest is the mazagan, which is small seeded; while the largest is the windsor. The field bean runs into two leading sub-varieties, a larger and a smaller one; the latter is called ticks. The horse bean is the variety *equina*.

The word is also applied to any leguminous plant resembling a bean, though not of the genuine genus *faba*. Such, for example, as the Florida bean, which is the seed, not the fruit, of a West Indian plant. These seeds are washed up on the Florida shore, and are sometimes used as food, and sometimes they are polished and used as ornaments. The navy bean is the common white bean, used largely as an article of diet by sailors. The pea bean is a small white bean used commonly as food. The tonquin bean is the fragrant seed of a leguminous tree.

In commerce, the word is applied to the seeds of certain plants belonging to the natural order *leguminosæ*. The common field bean is the seed of the *faba vulgaris*, the broad, or windsor bean, being a cultivated variety of the same plant. The French, or haricot bean, is the seed of *phaseolus multiflorus*, and the scarlet runner (which is closely akin to the former), is *phaseolus vulgaris*.

Scarlet runners and French beans are used in the pod, in the green state, and eaten as a vegetable. Bean meal, which is more easily digested than whole beans, contains twice as much nitrogenous matter as wheat flour, and is more nutritious.

BEAR, the English name of the various species of plantigrade mammals belonging to the ursus and some neighboring genera. The term plantigrade, applied to the bears, intimates that they walk on the soles of their feet; not, like the digitigrade animals, on their toes. Though having six incisor teeth in each jaw, like the rest of the carnivora, yet the tubercular crowns of the molar teeth show that their food is partly vegetable. They grub up roots, and, when they can obtain it, greedily devour honey. They hibernate in winter. The best known species is *ursus arctos*, the brown bear. They are wild in this country, on the continent of Europe, and in Asia. Other species are the Syrian bear (*ursus syriacus*, which is the bear of Scripture); the American black bear (*ursus americanus*); the grizzly bear of the same continent (*ursus ferox*); and the Polar bear (*ursus* or *thalassarctos maritimus*), and others.

The earliest representative of the *ursidæ*, or bear family, known at present, does not belong to the typical genus ursus. It is called amphicyon, and is of Miocene age.

Of Post-pliocene bears, one, *ursus priscus*, seems the same as *ursus ferox* (the grizzly bear). Several bears, *ursus spelæus*, *arctos*, and others, have been found in caves, in England and elsewhere. Of these, *ursus spelæus*, from the Greek *spelaios*=a grotto, cave, cavern, or pit, is the one called especially the cave bear. It is a giant species, occurring in the later rather than the earlier Post-pliocene beds.

In Stock Exchange parlance, a bear is one who contracts to sell on a specified day certain stock not belonging to him, at the market price then prevailing, on receiving imaginary payment for them at the rate which obtains when the promise was made. It now becomes his interest that the stock on which he has speculated should fall in price. The purchaser, called a "bull," sees it to his advantage to make the stock rise. The origin of the term is uncertain.

In astronomy, the word is applied to one or other of two constellations, Ursa Major and Ursa Minor, called respectively the Great Bear and the Little Bear. When the word Bear stands alone, it signifies Ursa Major.

BEARD, CHARLES AUSTIN, an American educator and historian, born at Knightstown, Ind., in 1874. He graduated from DePauw University in 1898 and took post-graduate studies at Oxford, Cornell, and Columbia universities, becoming adjunct professor of politics of Columbia University in 1907. He became successively assistant professor and professor in that subject. He resigned in 1916 and became director of the Training School for Public Service in New York City. He was a member of many historical and economic societies. His published writings include "Introduction to the English Historians" (1906); "Development of Modern Europe" (1907); "American Government and Politics" (1910); "American City Government" (1912); "Economic Origins of Jeffersonian Democracy" (1915).

BEARD, DANIEL CARTER, an American artist and writer, born in Cincinnati in 1850. He received an academic education and studied art in New York City from 1880 to 1884. He became well known as an illustrator of magazines and books. From 1893 to 1900 he was teacher of animal drawing at the Woman's School of Applied Design. He

was editor of "Recreation" from 1905 to 1906. He was one of the organizers of the Boy Scouts movement of the United States and was national scout commissioner and honorary vice-president of the Boy Scouts of America. He was the author of many books for boys, including "American Boys' Handy Book" (1882); "Dan Beard's Animal Book" (1907); "The Buckskin Book and Buckskin Calendar" (1911); "Shelters, Shacks and Shanties" (1914). He was chief of the school of woodcraft known as the Dan Beard Out-Door School.

BEARDSLEY, AUBREY, an English author and illustrator, born in Brighton, in 1874; received a grammar school education; began working for London periodicals and publishers in 1892; and soon became widely known by his striking designs for posters and book covers. In 1894 he became art editor of "The Yellow Book," and while supplying it with illustrations, contributed drawings also to the "Savoy" and "Le Courrier Française." He illustrated "Bons Mots" (1892); Malory's "La Morte d'Arthur" (1893); Oscar Wilde's "Salome" (1894); "The Rape of the Lock" and "An Album of Fifty Drawings" (1896); and wrote and illustrated "The Story of Venus and Tannhäuser" (1895); and a novel, "Under the Hill" (1896). He died in Mentone, France, March 16, 1898.

BEARDSTOWN, a city of Illinois, in Cass co. It is on the Illinois river, and on the Chicago, Burlington and Quincy, and the Baltimore and Ohio Southwestern railroads. It has railroad repair shops, manufactures of flour, cement posts, etc. It has also a considerable fishing industry. There is a park, a Carnegie library, and a city hall. Pop. (1910) 6,107; (1920) 7,111.

BEAR LAKE, GREAT, an extensive sheet of fresh water in the Mackenzie district of Canada, between about 65° and 67° 32′ N. lat.; and under the 120th degree of W. long.; of irregular shape; area about 14,000 square miles. The water is very clear, and the lake abounds in fish. Bear Lake river, the outlet at the S. W. extremity of Great Bear Lake, runs S. W. for 70 miles and joins the Mackenzie river.

BÉARN (byärn), formerly one of the 32 provinces into which France was divided, and now forming the greatest portion of the department of Basses-Pyrénées. The inhabitants are chiefly Gascons, with a strong infusion of Basque blood, and they speak the purest Gascon dialect. Béarn was a portion of Aquitania under the Romans, and, after the downfall of that Empire, under its ruling dukes, it was a country of considerable importance. From the intermarriage of the ruling family, the counts of Foix, with that of Navarre, sprang the French monarch, Henry IV., who, because he was born and brought up in Béarn, was derisively called Le Béarnois.

BEAR RIVER, a river of the United States, 400 miles long; rises in the N. of Utah, and flows N. into Idaho; turns abruptly S., re-enters Utah, and empties into Great Salt Lake.

BEATON, DAVID, Cardinal Archbishop of St. Andrew's, Scotland, born in 1494. He became Abbot of Arbroath in 1525, Lord Privy Seal three years later, was sent on several missions to France, received a cardinal's hat in 1538, and in the following year became Primate. On the death of James V., he, by craft and determination, secured to himself the chief power in Church and State, being named Lord High Chancellor of Scotland, and Papal Legate. He opposed an alliance with England, and especially distinguished himself as a persecutor of the Reformers. The trial and burning of George Wishart for heresy took place under his direction, and a short time afterward Beaton was assassinated at St. Andrew's in May, 1546. With his death, church tyranny came to an end in Scotland.

BEATRICE, city and county-seat of Gage co., Neb.; on the Big Blue river, and several railroads; 40 miles S. of Lincoln, the State capital. It is the seat of the State Institution for Feeble-Minded Youth; and has an attractive court house, United States Government Building, water works, electric light and street railway plants, public library, National banks, excellent water power, flour and planing mills, tile and barbed wire works, creamery, iron foundry, and manufactories of gasolene engines, wind mills, and farming implements. It is the center of a rich agricultural country. Pop. (1910) 9,356; (1920) 9,664.

BEATTIE, JAMES, a Scottish poet and miscellaneous writer, born at Laurencekirk, Kincardineshire, Oct. 25, 1735; studied at Marischal College, Aberdeen, for four years, and received the M. A. degree. In 1753 he was appointed schoolmaster at Fordoun, afterward master of the Grammar School of Aberdeen, and ultimately Professor of Moral Philosophy and Logic in Marischal College. In 1760 he published a volume

of poems. In 1765 he published a poem, the "Judgment of Paris," and in 1770 his celebrated "Essay on Truth," for which the University of Oxford conferred on him the degree of LL. D.; and George III. honored him, when on a visit to London, with a private conference and a pension. He next published in 1771 the first book of his poem, the "Minstrel," and in 1774 the second; this is the only work by which he is now remembered. In 1776 he published dissertations on "Poetry and Music," "Laughter and Ludicrous Composition"; in 1783 and in 1790-1793 "Elements of Moral Science." He died in Aberdeen, Aug. 18, 1803.

BEATTY, DAVID, EARL, a British admiral, born in 1871. He chose a naval career, and from the start manifested those qualities of judgment and intrepidity that signalized his work in all stages of the service. In 1898, serving in the Kitchener expedition on the Nile, he won the D. S. O. He was in the Boxer Rebellion and gave distinguished service at Tien-Tsin, where he was twice wounded. In 1900 he was made captain, and in 1910 became rear admiral. For two years prior to the outbreak of the World War he was naval secretary to the First Lord of the Admiralty. In 1913 he became commander of the First Battle Cruiser Squadron. The first action of importance in which he participated was the fight in the Bight of Helgoland, which resulted in a British victory. His casualties were slight, while the Germans lost five ships, 700 of their men being drowned or otherwise killed, while 300 were captured. In the Dogger Bank action of Jan. 24, 1915, his squadron scored another triumph, only two of his ships being hit, while the German armored cruiser "Blücher," after having been put out of action, turned turtle and sank with heavy loss of life. The battle of Jutland, the greatest naval action of the war, was fought May 31, 1916. Both sides suffered severely and conflicting claims were made as to the side with which victory rested. In this action, Beatty for a while was engaged with much inferior forces against practically the whole of the German High Seas Fleet. His cruiser squadron fought brilliantly in the effort to hold the Germans until the Grand Fleet under Jellicoe could arrive and get into action. The Germans drew off and retreated under cover of the night, leaving the British still holding the seas, as they had done up to that time. When Jellicoe was made First Sea Lord on Nov. 29, 1917, Beatty was made commander of the grand fleet, which office he held until the close of the conflict. In that capacity it fell to him to receive the surrender of the German fleet off the Firth of Forth, Nov. 21, 1918. He received many decorations and was made an earl in 1919.

BEAUFORT, HENRY, CARDINAL, natural son of John of Gaunt and half brother of Henry IV., King of England, born 1377; was made Bishop of Lincoln, whence he was translated to Winchester. He repeatedly filled the office of Lord Chancellor, and took part in all the most important political movements of his times. He died April 11, 1447.

BEAUHARNAIS (bō-här-nā'), the name of a noble French family, of which the following are historical personages:

BEAUHARNAIS, ALEXANDRE, VICOMTE DE, born at Martinique, 1760. He served under Rochambeau in the War of American Independence. On his afterward taking up his residence in France, he was elected a Deputy to the States-General, where he espoused the Democratic or Liberal party, became President of the National Assembly, and played a conspicuous part in the Revolution. Beauharnais served with distinction in the French army, but became ultimately a victim to the Revolutionary Tribunal just previous to the fall of Robespierre, in 1794. His widow, Josephine Tascher de la Pagerie, became the first wife of Napoleon I. in 1796.

BEAUHARNAIS, FRANÇOIS, MARQUIS DE, elder brother of the preceding, born in 1756. He was a Major-General in the French army, protested against revolutionary excesses in a letter to the President of the National Assembly, and, on Bonaparte becoming First Consul, recommended him to restore the scepter to the House of Bourbon. He was afterward Ambassador to Spain, but fell into disgrace with Napoleon, and was banished. He returned to Paris after the Restoration, and died March 4, 1846.

BEAUHARNAIS, EUGÈNE DE, Viceroy of Italy, and a Prince of the French Empire, son of Alexandre de Beauharnais and Josephine, born in Paris in 1781. After his mother's marriage to Napoleon, he, in 1796, became aide-de-camp to the latter, and served with distinction in the campaigns of Italy and Egypt. Beauharnais was wounded at Acre, contributed to the victory of Marengo, was created Prince of the Empire in 1805, and Viceroy of Italy. In 1806, he married the Princess Amelia Augusta, of Bavaria, and in the same year was adopted by the Emperor as his son, and appointed governor of Lombardy and Venice. He served in the campaign of 1809, defeated the Austrians at Raab, and distinguished

himself at Wagram. His military talents were particularly evinced in the retreat from Moscow and in the following campaigns of 1813-1814. To Beauharnais may be mainly ascribed the victory of Lützen. After the fall of Napoleon, he retired to Munich, was allowed, by the Treaty of Fontainebleau and the Congress of Vienna, to retain his extensive possessions in Italy, and took his place as Duke of Leuchtenberg among the Bavarian nobles. His children subsequently ranked as members of the imperial family of Russia. He died Feb. 21, 1824.

BEAUMARCHAIS (bō-mär-shā'), **PIERRE AUGUSTIN, BARON DE,** born in Paris, Jan. 24, 1732. He was a man of singular versatility of talent, being by turns politician, artist, dramatist, and merchant. His father was a watchmaker and brought up his son to the same profession. His fame rests on his plays, and chiefly on the two, "Le Barbier de Seville" (1775), and "Le Marriage de Figaro" (1784). The character of *Figaro* was a happy invention, and the other principal characters, in both plays, are drawn with great skill. He wrote a third play, "La Mère Coupable," which may be considered as a sequel to the other two, but is inferior to them in many respects. At the beginning of the American War of Independence (1777), Beaumarchais entered into a speculation for supplying the colonies with arms, ammunition, etc.; he lost several vessels, three of which were taken in one day by the English cruisers in coming out of the river at Bordeaux, but the greater number arrived in America, and inspired the colonists with renewed hope. When the French Revolution broke out, Beaumarchais showed himself favorable to the popular cause, and entered into speculations to supply corn, muskets, etc. But his activity in that critical period exposed him to suspicion and he fled to England and then to Germany. He returned to France after the fall of Robespierre, and then entered into a new speculation in salt, by which he lost a large sum. He died in Paris, May 18, 1799.

BEAUMONT, FRANCIS, and **FLETCHER, JOHN,** two eminent English dramatic writers, contemporaries of Shakespeare, and the most famous of literary partners, so closely associated that their names are rarely heard separately. The former, son of a Common Pleas judge, was born at Grace-Dieu, in Leicestershire, in 1584. At the age of 16 he published a translation, in verse, of Ovid's fable of "Salmacis and Hermaphroditus," and later he became the friend of Ben Jonson. With Fletcher also he was early on terms of friendship. He married Ursula, daughter of Henry Isley, of Sundridge, in Kent, by whom he left two daughters. He died March 6, 1616, and was buried in Westminster Abbey. JOHN FLETCHER was born at Rye, Sussex, in December, 1579. His father was successively Dean of Peterborough, Bishop of Bristol, Worcester, and London. The "Woman Hater," produced in 1606-1607, is the earliest work known to exist in which he had a hand. It does not appear that he was ever married. He died in London in August, 1625, and was buried at St. Saviour's, Southwark. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names consist of over 50 plays, a masque, and some minor poems. It is believed that all the minor poems except one were written by Beaumont. After the death of Beaumont, Fletcher continued to write plays alone or with other dramatists. It is now difficult, if not indeed impossible, to determine with certainty the respective shares of the two poets in the plays passing under their names. "Four Plays in One," "Wit at Several Weapons," "Thierry and Theodoret," "Maid's Tragedy," "Philaster," "King and No King," "Knight of the Burning Pestle," Cupid's Revenge," "Little French Lawyer," "Scornful Lady," "Coxcomb," and "Laws of Candy" have been assigned to Beaumont and Fletcher conjointly. To Beaumont alone "The Masque of the Inner Temple and Gray's Inn." To Fletcher alone "The Faithful Shepherdess," "Woman Hater," "Loyal Subject," "Mad Lover," "Valentinian," "Double Marriage," "Humorous Lieutenant," "Island Princess," "Pilgrims," "Wild Goose Chase," "Spanish Curate," "Beggar's Bush," "Rule a Wife and Have a Wife," "Fair Maid of the Inn." To Fletcher and Rowley "Queen of Corinth," "Maid of the Mill," and "Bloody Brother." To Fletcher and Massinger "False One," and "Very Woman." To Fletcher and Shirley "Noble Gentleman," "Night Walker," and "Love's Pilgrimage." To Fletcher and Shakespeare "Two Noble Kinsmen."

BEAUMONT, city and county-seat of Jefferson co., Tex.; on the Neches river and several railroads; 80 miles N. E. of Houston. It is an important shipping point; is at the head of tidewater navigation; and has a variety of important manufactures. It has become the center of the large petroleum fields of Texas,

the Beaumont oil field being one of the largest in the world. Pop. (1910) 20,640; (1920) 40,422.

BEAUREGARD, PIERRE GUSTAVE TOUTANT (bō-re-gär'), an American military officer, born in St. Martin's parish, La., May 28, 1818; was graduated at the United States Military Academy and appointed a brevet Second Lieutenant of Artillery in 1838; was promoted First Lieutenant and transferred to the Corps of Engineers in 1839; distinguished himself in the Mexican War, where he won the brevet of Captain for gallantry at Contreras and Churubusco, and of Major for Chapultepec, where he was twice wounded. He resigned his commission after the secession of Louisiana in February, 1861, and was appointed commander of the Confederate forces at Charleston, S. C., and there opened the hostilities of the Civil War by bombarding Fort Sumter, on April 11. After the evacuation of the Fort by Major Anderson, General Beauregard was transferred to Virginia where he commanded the Confederate forces in the battle of Bull Run, on July 21. In March, 1862, he was ordered to the Army of the Mississippi, under Gen. Albert S. Johnston, and in April following fought the battle of Shiloh, gaining a victory over the National forces the first day, but being defeated by General Grant on the second day. Failing health kept him from active duty till June, 1863, when he took charge of the defense of Charleston against the combined land and naval forces. He remained in command there till April, 1864, when he was ordered to Richmond to strengthen its defenses. On May 16, he attacked General Butler in front of Drury's Bluff, and forced him back to his intrenchments between the James and the Appomattox rivers. In anticipation of General Sherman's successful march through the Carolinas, he ordered General Hardee to evacuate Charleston, which was done, Feb. 17, 1865. He attempted to aid General Joseph E. Johnston in opposing General Sherman, but in April surrendered with the former to the latter. After the war he became president of the New Orleans, Jackson and Mississippi Railroad Company, Adjutant-General of the State, and a manager of the Louisiana State Lottery. In 1866 the chief command of the Rumanian army was tendered to him, and in 1869 that of the army of the Khedive of Egypt, both of which he declined. He published "The Principles and Maxims of the Art of War" (Charleston, 1863), and "Report of the Defense of Charleston" (Richmond, 1864), and was the last survivor of the full generals of the Confederacy. He died in New Orleans, Feb. 20, 1893.

BEAUVAIS (bō-vā), (ancient Bellovacum), a town of France, capital of the department of Oise, at the confluence of the Avelon with the Thérain, 43 miles N. of Paris. It has some fine edifices, the choir of the uncompleted cathedral being one of the finest specimens of Gothic architecture in France. In 1472 Beauvais resisted an army of 80,000 Burgundians under Charles the Bold. There are numerous manufacturing establishments, notably woolens and tapestries. Pop. about 20,000.

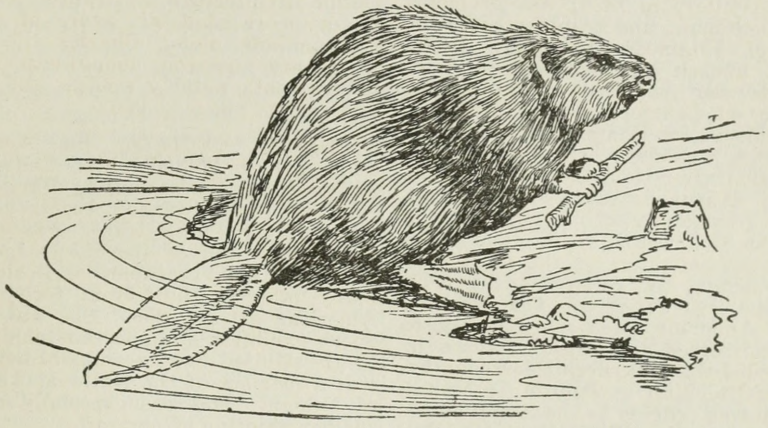
BEAUX, CECILIA, an American artist, born in Philadelphia. She studied art in Philadelphia and in Paris. She was four times awarded the Mary Smith Prize at the Pennsylvania Academy of Fine Arts, received also the Dodge prize of the National Academy of Design and many other medals from foreign and American art societies. She was a frequent exhibitor at important exhibitions in the United States and abroad. She was a member of the National Academy of Design. She was especially notable for her painting of portraits.

BEAUX-ARTS, ÉCOLE DES, a national school of fine arts in France, founded in 1648. It received its final title in 1893. Affiliated with it are a number of ateliers, which are practically workshops. The École includes schools of architecture, painting, and sculpture. Courses in drawing, painting, sculpture, and architecture and other branches of art are free. The Prix de Rome is awarded each year. Many American artists have been trained at the École. Its home is the Palais des Beaux-Arts, where it maintains a noted collection of copies of famous paintings made by the winners of the Prix de Rome.

BEAUX-ARTS INSTITUTE OF DESIGN, a society incorporated in 1916 to carry on the work previously conducted by the Society of Beaux-Arts Architects. There are departments of architecture, sculpture, mural painting, and interior decoration. The Paris Prize is offered annually, and by its terms the winner receives $1,200 yearly for two and a half years to study architecture in Paris at the École des Beaux-Arts.

BEAVER, the English name of the well known rodent mammal *castor fiber*, or, more loosely, of any species belonging to the genus castor. The animal so designated has in each jaw two powerful incisor teeth, coated with hard enamel, by means of which it is enabled to cut

across the trunks of the trees which it requires for its engineering schemes. The hind feet are webbed, and one of the five toes has a double nail. The tail is flattened horizontally, and covered with scales. Large glandular pouches secrete an odoriferous substance called castoreum. The *castor fiber* exists through the temperate and colder parts of this country.



BEAVER

BEAVER DAM, a city in Wisconsin, in Dodge co. It is on the Chicago, Milwaukee and St. Paul, and the Chicago and Northwestern railroads. It is the center of an extensive agricultural region and has excellent water power. Its industries include flour and woolen mills, the manufacture of machinery, stoves, etc. There are parks, a library, a hospital, an opera house, and Wayland Academy. Pop. (1910) 6,758; (1920) 7,992.

BEAVER DAM, a dam built by a beaver across a stream likely to run off in summer. It is generally formed of drift wood, green willows, birch, poplars, and similar materials.

BEAVER FALLS, a borough in Beaver co., Pa., on the Beaver river, near its junction with the Ohio, and on the Pennsylvania and New York Central railroads, 7 miles N. of Beaver, the county-seat. It has natural gas; good water power for manufacturing; produces steel, iron, wire, glass ware, pottery, shovels, etc. It is the seat of Geneva College (Reformed Presbyterian). Pop. (1910) 12,191; (1920) 12,802.

BEBEL, FERDINAND AUGUST (bā'bel), a German Socialist, born in Cologne in 1840. In his youth he was an apprentice, and, while learning and practicing the turner's trade, he acquired a practical knowledge of the difficulties and disabilities of the workingmen. He settled in Leipsic in 1860, joined various labor organizations, and became one of the editors of the "Volksstaat" and of the "Vorwärts." Membership in the North German Reichstag was followed by his election to the German Reichstag, of which he was a member from 1871 to 1881, and which he entered again in 1883. He was the leader of his party in the Reichstag, even though, representing as he did the Marxian principles, he was bitterly opposed by certain factions. He wrote "Our Aims" (1874); "The German Peasant War" (1876); "The Life and Theories of Charles Fourier" (1888); "Women in Socialism, the Christian Point of View in the Woman Question" (1893); "My Life" (1910-1912). He died August 14, 1913.

BECHUANALAND, an extensive tract in South Africa, inhabited by the Bechuanas, extending from 28° S. lat. to the Zambezi, and from 20° E. long. to the Transvaal border. Until 1895 Bechuanaland included the Crown Colony of British Bechuanaland and the Bechuanaland Protectorate. In that year the Crown Colony was annexed to Cape Colony, and the Protectorate placed under the administration of the High Commissioner. The Protectorate has an area of about 275,000 square miles; and extends from the Molopo river in the S. to the Zambezi in the N., and is bounded on the E. by the Transvaal province and Matabeleland, and on the W. by Southwest Africa. Pop. about 125,000.

Bechuanaland is a portion of an elevated plateau 4,000 to 5,000 feet above the level of the sea, and, though so near the tropics, is suitable for the British

race. In winter there are sharp frosts, and snow falls in some years. The rains fall in summer, and then only the rivers are full. It is an excellent country for cattle; sheep thrive in some parts, and there are extensive tracts available for corn lands; but it is not a wheat country on account of the summer rains. It can be reached from Cape Town, Port Elizabeth, Durban, Delagoa Bay, and the Zambezi, the railroad from the former being extended from Kimberley, Vryburg, Mafeking, Palachwe, Tati, and Bulawayo. There are extensive forests to the N. E., and to the W. the Kalahari Desert.

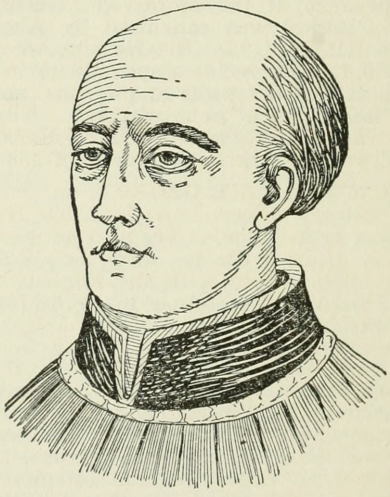
Gold has been found near Sitlagoli, and there are indications of gold-bearing quartz reefs in many directions. Diamondiferous soil is also said to exist in several localities; indeed, diamonds were discovered at Vryburg in the autumn of 1887.

The province of Stellaland is principally inhabited by Boers, and the remainder of the country by Bechuanas. The Bechuanas are a black race, possessing a language in common with the Bantu races of South Africa, extending as far N. as the equator. The Bechuanas have divided up within the last 150 years, and comprise the Bahurutse, Bamangwato, Bakwena, Bangwaketse, Barolongs, Batlapins, and Batlaros. Each tribe has an animal as an emblem, or heraldic sign, which it is said they hold in esteem. They have since 1832 been at enmity with the Matabele. During the native risings in 1878, the Bechuanas invaded Griqualand West, and were in turn subdued by British volunteers as far as the Molopo. When the British Government withdrew from Bechuanaland in 1880, the natives, being helpless, were left to the mercy of the Boers of the Transvaal, whose harsh treatment in 1882 and 1883 led to the Bechuanaland expedition in 1884. The system of government among the Bechuanas would be termed in Europe local government. All important matters are decided in the public assembly of the freemen of the town, but matters are previously arranged between the chiefs and headmen. During the British-Boer War of 1899-1900, Mafeking was the scene of one of the most determined and successful defenses in history.

BECK, JAMES MONTGOMERY, an American lawyer and publicist, born in Philadelphia in 1861. He graduated from Moravian College in 1880. In 1884 he was admitted to the bar. From 1896 to 1900 he was United States attorney for the Eastern District of Pennsylvania, and from 1900 to 1903 was assistant attorney-general of the United States. At the outbreak of the World War he took a strong stand against Germany and wrote much and delivered many addresses to show Germany's responsibility. He delivered many orations on notable occasions on various subjects. He wrote "The Evidence in the Case" (1914); "War and Humanity" (1916).

BECKER, GEORGE FERDINAND, an American geologist, born in New York, Jan. 5, 1847; graduated at Harvard University in 1868; was Instructor of Mining and Metallurgy in the University of California in 1875-1879; attached to the United States Geological Survey since 1879, and Special Agent of the 10th Census, 1879-1883. He was appointed a special agent to examine into the mineral resources of the Philippine Islands in 1898 and was later placed in charge of the chemical and physical research division, United States Geological Survey. He was also geophysicist of the Carnegie Institution and a member of several scientific associations. His publications include "Geology of the Comstock Lode," "Geology of the Quicksilver Deposits of the Pacific Slope," "Age of Earth," etc.

BECKET, THOMAS À, an Archbishop of Canterbury, the son of a London merchant, born in 1118; studied



THOMAS À BECKET

at Oxford and Bologna. Henry II., in 1158, made Becket his chancellor, and in 1162 he was appointed to the primacy. He then laid aside all pomp and luxury, and led a life of monastic austerity. In the controversy which immediately arose, respecting the limits of civil and eccle-

siastical authority, Becket asserted against the King the independence of the Church, and refused to sign the "Constitutions of Clarendon." By a Council, or Parliament, held at Northampton, in 1164, Becket was condemned and suspended from his office. He escaped, in disguise, to France, where he obtained the protection of its King. In response to his excommunication of the clergy who signed the "Constitutions," and some of the King's officers, the King, in 1166, banished all the relations of Becket and forbade all communication with him. War with France followed. Peace was made in 1169, between Henry and Louis. In 1170, a meeting took place between the King and the Archbishop at Fretteville, where they were professedly reconciled, and Becket returned to Canterbury. He at once published the Pope's sentence of suspension against the Archbishop of York, and other prelates, who had crowned Prince Henry. The King's angry expressions, on learning this, induced four of his barons (Richard Brito, Reginald Fitzurse, Hugh de Morville, and William Tracy) to go immediately to Canterbury; and after unsuccessfully remonstrating with Becket, they followed him into the Cathedral, and murdered him on the steps of the altar, Dec. 31, 1170. The King denied all share in this deed, and was absolved; but in 1174 he did penance at the murdered prelate's tomb. Becket was canonized by Alexander III., in 1172. His remains were, in 1220, transferred to a splendid shrine, which attracted crowds of pilgrims, and was loaded with rich offerings. This immense treasure was seized by Henry VIII., and the shrine destroyed in 1538.

BECKWITH, SIR GEORGE, an English military officer, born in 1753. His scene of action was largely in America—in the United States, and the West Indies. He fought with the English in the American Revolution in 1776-1782, and was intrusted with important diplomatic commissions in 1782-1791, as there was then no British Minister to the United States. In 1804, he was made governor of St. Vincent, and four years later governor of Barbadoes. As England was then at war with France, he organized an expedition and conquered Martinique, for which he obtained the thanks of the House of Commons. Later (1810) he conquered Guadeloupe, the last possession of the French in that part of the world. He died in London, March 20, 1823.

BECKWITH, JAMES CARROLL, an American genre painter, born in Hannibal, Mo., Sept. 23, 1852; was a pupil of Carolus Duran, and became a member of the National Academy in 1894. He taught for many years at the art Students' League, New York. Among his paintings are "Under the Lilacs"; "The Falconer"; etc. His best works were his portraits of Mark Twain, General Schofield and others, at Yale, Johns Hopkins, Union League, etc. He died in October 1917.

BED, in ordinary language, an article of domestic furniture to sleep upon. Originally, a bed was the skin of a beast stretched upon the floor; then rushes, heath, and after a time straw were substituted. A modern bed consists of a large mattress stuffed with feathers, hair, or other materials, with bolster, pillow, sheets, blankets, etc., the whole raised from the ground on a bedstead. The term bed sometimes excludes and sometimes includes the bedstead. In India, and other Eastern countries, the bed of a native, at least on his travels, is simply a mat, a rug, or a bit of old carpet; his bed clothes are his scarf or plaid.

In mechanics, a bed is the foundation piece or portion of anything on which the body of it rests, as the bed piece of a steam engine; the lower stone of a grinding mill; or the box, body, or receptacle of a vehicle.

BEDDOES, THOMAS, an English physician and author, born in Sheffield, April 13, 1760; educated at Oxford, London, and Edinburgh. After taking his doctor's degree and visiting Paris, he was appointed Professor of Chemistry at Oxford. There he published some excellent chemical treatises, and "Observations" on the calculus, sea scurvy, consumption, catarrh, and fever. His expressed sympathy with the French revolutionists led to his retirement from his professorship in 1792, soon after which he published his "Observations on the Nature of Demonstrative Evidence," and the exceedingly popular "History of Isaac Jenkins." In 1794 he married a sister of Maria Edgeworth; and in 1798, with the pecuniary aid of Wedgwood, opened a "pneumatic" institution for curing phthisical and other diseases by inhalation of gases. It speedily became an ordinary hospital, but was noteworthy as connected with the discovery of the properties of nitrous oxide, and as having been superintended by the young Humphry Davy. Beddoes' essays on "Consumption" (1779), and on "Fever" (1807), and his "Hygeia" (3 vols., 1807), had a high contemporary repute. He died Dec. 24, 1808.

BEDE or **BÆDA**, the greatest figure in ancient English literature, was born near Monkwearmouth, Durham, about 673. Left an orphan at the age of six, he was educated in the Benedictine Abbey at Monkwearmouth, and entered the monastery of Jarrow, where he was ordained priest in his 30th year. His industry was enormous. Bede wrote homilies, lives of saints, hymns, epigrams, works on grammar and chronology, and the great "Ecclesiastical History of England," in five books, gleaned from native chronicles and oral tradition. This was translated from Latin into Anglo-Saxon by King Alfred. The first editions were issued from Strassburg in the 15th century. He died in the monastery of Jarrow, May 26, 735.

BEDFORD, a parliamentary and municipal borough of England, the county town of Bedfordshire, on the Ouse. The chief buildings are the law courts, a range of public schools, a large infirmary, County Jail, etc., and the churches. The town is rich in charities and educational institutions, the most prominent being the Bedford Charity, embracing grammar and other schools, and richly endowed. There is an extensive manufactory of agricultural implements; lace is also made, and there is a good trade. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned. Pop. (1917) 37,663.

BEDFORD, a city of Indiana, the county-seat of Lawrence co. It is on the Chicago, Indianapolis, and Louisville, the Baltimore and Ohio Southwestern, and the Terre Haute and Southeastern railroads. The chief industry is the quarrying of stone. There are also railroad shops, roundhouses, cement works, etc. The public buildings are especially notable, being constructed chiefly of stone. Pop. (1910) 8,716; (1920) 9,076.

BEDFORD, JOHN PLANTAGENET, DUKE OF, Regent of France, third son of Henry IV. of England, was born June 20, 1389. He was created Constable of England in 1403; and sent to succor Harfleur in 1416. In 1422, Charles VI. of France died, and long years of war followed between the rival claimants for the crown, Charles VII. and Henry VI. Bedford secured the alliance of the Dukes of Burgundy and Brittany, and obtained a long series of military successes. The tide turned at the siege of Orleans, which was raised by Joan of Arc. The Duke of Brittany had previously abandoned the English cause; the Duke of Burgundy did the same in 1435; and Bedford died at Rouen, Sept. 19, 1435.

BEDFORD LEVEL, an eastern district of England, comprising about 450,000 acres of what is called the "Fen" country, in the counties of Cambridge (including the whole of the Isle of Ely), Suffolk, Norfolk, Huntingdon, Northampton, and Lincoln. It was a mere waste of fen and marsh, until the time of Charles I., when, in 1634, a charter was granted to Francis, Earl of Bedford, who undertook to drain the level, on condition of being allowed 95,000 acres of the reclaimed land. It now forms one of the most fertile and grain-productive districts in the kingdom.

BEDFORDSHIRE, a county of England, in the midland group. It has an area of 466 square miles, the greater part of which is meadow and pasture land. The chief industries are stock raising, dairying, and agricultural pursuits. The industries include the manufacture of agricultural implements, lace, and straw goods. The chief towns are Bedford, the capital, Dunstable, and Luton. Pop. about 200,000.

BEDLAM, a contraction from Bethlehem, and the name of an English hospital for lunatics. The Hospital of St. Mary Bethlehem was first a priory, founded in 1247, by an ex-sheriff, Simon Fitz Mary. Its original site was in Bishopsgate. The Priory of St. Mary Bethlehem, like the other English monastic establishments, was dissolved at the Reformation, Henry VIII., in 1547, granting its revenues to the mayor, the commonalty and the citizens of London. They made it a hospital for lunatics. In 1676 the original buildings were superseded by those of the New Hospital of Bethlehem, erected near London Wall. Finally, in 1815, the hospital was transferred to Lambeth.

BEDLOE'S ISLAND, an island in New York harbor; ceded to the United States Government in 1800; the site of Fort Wood, erected in 1841 and mounted with 77 guns; now the location of Bartholdi's colossal statue of "Liberty Enlightening the World."

BEDOUINS (bed-ö-enz'), Mohammedan people of Arab race, inhabiting chiefly the deserts of Arabia, Syria, Egypt, and North Africa. They lead a nomadic existence in tents, huts, caverns and ruins, associating in families under sheiks or in tribes under emirs. In respect of occupation they are only shepherds,

herdsmen, and horse breeders, varying the monotony of pastoral life by raiding on each other and plundering unprotected travelers whom they consider trespassers. The ordinary dress of the men is a long shirt girt at the loins, a black or red and yellow handkerchief for the head, and sandals; of the women, loose drawers, a long shirt, and a large dark-blue shawl covering the head and figure. The lance is the favorite weapon.

BEE, the common name given to a large family of hymenopterous or membranous-winged insects, of which the most important is the common hive or honey bee (*apis mellifica*). It belongs to the warmer parts of the Eastern Hemisphere, but is now naturalized in the Western. A hive commonly consists of one mother or queen, from 600 to 800 males or drones, and from 15,000 to 20,000 working bees, formerly termed neuters, but now known to be imperfectly developed females. The last mentioned, the smallest, have twelve joints to their antennæ, and six abdominal rings, and are provided with a sting; there is, on the outside of the hind legs, a smooth hollow, edged with hairs, called the basket, in which the kneaded pollen or bee bread, the food of the larvæ, is stored for transit. The queen has the same characteristics, but is of larger size, especially in the abdomen; she has also a sting. The males, or drones, differ from both the preceding by having 13 joints to the antennæ; a rounded head with larger eyes, elongated and united at the summit; and no stings. Bees undergo perfect metamorphosis, the young appearing first as larvæ, then changing to pupæ, from which the imagos or perfect insects spring. The season of fecundation occurs about the beginning of summer, and the laying begins immediately afterward, and continues until autumn; in the spring as many as 12,000 eggs may be laid in 24 days. Those laid at the commencement of fine weather all belong to the working sort, and hatch at the end of four days. The larvæ acquire their perfect state in about 12 days, and the cells are then immediately fitted up for the reception of new eggs. The eggs for producing males are laid two months later, and those for the females immediately afterward. This succession of generations forms so many distinct communities, which when increased beyond a certain degree leave the parent hive to found a new colony elsewhere. Thus three or four swarms sometimes leave a hive in a season. A good swarm is said to weigh at least six or eight pounds. Besides the common bee (*A. mellifica*) there are the *A. fasciata*, domesticated in Egypt, the *A. ligustica*, or Ligurian bee of Italy and Greece, introduced into England, etc.

The humble-bees, or bumble-bees, of which about 40 species are found in Great Britain and over 60 in North America, belong to the genus *bombus*, which is almost world-wide in its distribution. Some bees, from their manner of nesting, are known as "mason bees," "carpenter bees," and "upholsterer bees." Some of these bees (genus *osmia*) cement particles of sand or gravel together with a viscid substance in forming their nests; others make burrows in wood. The leaf-cutter or upholsterer bee (genus *megachile*) lines its burrow with bits of leaf cut out in regular shapes.

The finest honey for export is gathered from hives where white clover and bass wood are accessible, although golden rod and buckwheat blossoms afford an excellent yield. The States producing the largest amount of honey are, in the order named, California, Texas, Michigan, Iowa and Wisconsin. The total production exceeds 60,000,000 pounds annually.

BEEBE, (CHARLES) WILLIAM, an American ornithologist and writer, born in Brooklyn, N. Y., in 1877. He graduated from Columbia University in 1898 and in the following year took post-graduate courses in that institution. In 1902 he was appointed curator of ornithology at the New York Zoölogical Park and was director also of the British Guiana Zoölogical Station. He carried on many researches in British Guiana and contributed many articles to scientific and popular magazines. Among his published writings are "Two Bird Lovers in Mexico" (1905); "Our Search for a Wilderness" (1910); "Tropical Wild Life" (1917); "Monograph of the Peasants" (1918); etc. He was a frequent contributor to magazines.

BEECH, a tree, the *fagus sylvatica*, or the genus *fagus* to which it belongs. It is ranked under the order *corylaceæ* (mast-worts). The nuts are triquetrous, and are placed in pairs within the enlarged prickly involucre. They are called mast, and are devoured in autumn by swine and deer. The wood is brittle and is used by turners, joiners, and millwrights. The fine thin bark is employed for making baskets and band-boxes.

BEECHER, EDWARD, an American clergyman and author, brother of Henry Ward Beecher, born in Easthampton, N. Y., Aug. 27, 1803. He graduated at Yale, studied theology at Andover, and New Haven; was pastor of various Congregational churches, especially the Park

Street, Boston (1826-1830), and Salem Street, Boston (1844-1855). He was President of Illinois College, Jacksonville (1830-1844), and for some years Professor of Exegesis in the Chicago Theological Seminary. He wrote many religious books, including "The Conflict of Ages" (1853), and "The Concord of Age" (1860). He died in Brooklyn, N. Y., July 28, 1895.

BEECHER, HENRY WARD, an American clergyman, born in Litchfield, Conn., June 24, 1813. He was the son of Lyman Beecher; graduated from Amherst in 1834; studied in Lane Theological Seminary, near Cincinnati, O.; and began clerical duty as pastor of a church in Lawrenceburg, Ind., removing to Indianapolis in 1839. From 1847 until his death he was Pastor of Plymouth Congregational Church in Brooklyn. He was one of the founders of the "Independent" and of the "Christian Union" (now the "Outlook"). He was also a prominent anti-slavery orator, as well as a famous lecturer. Among his numerous publications are "Star Papers; or Experiences of Art and Nature" (1855); "Freedom and War" (1863); "Eyes and Ears" (1864); and a novel, "Norwood, or Village Life in New England" (1867). His "Sermons" were edited by Dr. Lyman Abbott (2 vols., 1868). He died in Brooklyn, N. Y., March 8, 1887.

BEECHER, LYMAN, an American clergyman, born in New Haven, Conn., Oct. 2, 1775. His ancestors vere Puritans. He graduated from Yale in 1796, and became pastor of the Presbyterian Church in Easthampton, L. I.; then of a Congregational church in Litchfield, Conn., in 1810; and then of the Hanover Street Congregational Church in Boston, Mass. In 1832 he became President of Lane Theological Seminary, near Cincinnati, O. His influence throughout the country was very great, especially on the questions of temperance and of slavery. His sermon on the death of Alexander Hamilton, in 1804, with his "Remedy for Dueling" (1809), did much toward breaking up the practice of dueling in the United States. His collected "Sermons and Addresses" were published in 1852. He died in Brooklyn, N. Y., June 10, 1863.

BEEF, the flesh of the ox or the cow, used either fresh or salted. It is the most nutritious of all kinds of meat, and is well adapted to the most delicate constitutions. It should be well cooked, as it has been proved that underdone beef frequently produces tapeworm. Good beef is known by its having a clear, uniform fat, a firm texture, a fine open grain, and a rich reddish color. Meat which feels damp and clammy should be avoided, as it is generally unwholesome. Fresh beef loses in boiling 30 per cent. of its weight; in roasting it loses about 20 per cent. The amount of nitrogenous matter found to be present in one pound of good beef is about four ounces. In the raw state it contains 50 per cent. of water.

BEER, the fermented infusion of some cereal, variously flavored, usually the infusion of barley flavored with the bitter of hops. The varieties in trade are very numerous, as lager and Bavarian, white and brown, sweet and bitter, many beers of local names, some celebrated, as Milwaukee, St. Louis, Munich, Pilsen, and so on. Lager beer was formerly a winter beer as distinguished from summer beer. There is also a March beer, a bock beer, and very many other varieties. The root beers are non-alcoholic drinks flavored with sassafras or some other similar substance. See BREWING.

BEERBOHM, MAX, an English author and artist, born in 1872. He was educated at Merton College, Oxford. His literary career began with contributions to "The Yellow Book." He attracted the attention of Lord Northcliffe and began writing for the latter's papers. Soon he contributed to most of the important English periodicals. He had remarkable talent as a caricaturist and he employed his pencil with great success in depicting the leading figures of English social and political life. His writings display great wit and powers of satire. They include "The Happy Hypocrite"; "The Poet's Corner"; "The Second Childhood of John Bull"; "Zuleika Dobson," a novel.

BEERS, HENRY AUGUSTIN, an American educator, born in Buffalo in 1847. He graduated from Yale University in 1869, and in the following year he was admitted to the bar of New York. He joined the faculty of Yale University as tutor in 1871 and became assistant professor in 1864 and professor of English literature in 1880. He wrote "A Century of American Literature" (1878); "From Chaucer to Tennyson" (1890); "The Ways of Yale" (1895); "Points at Issue" (1904); etc. He was a frequent contributor to the leading magazines and wrote, in addition to those mentioned above, several volumes of verse.

BEERSHEBA (now Bir-es-Seba, "the well of the oath"), the place where Abraham made a covenant with Abimelech, and in common speech, representative of the southernmost limit of Palestine, near which it is situated. It is now a mere heap of ruins.

BEES' WAX, the wax of bees, used by them for constructing their cells. It is a secretion elaborated within the body of the animal from the saccharine matter of honey, and extruded in plates from beneath the rings of the abdomen.

BEET, the English name of the *beta*, a genus of plants belonging to the order *chenopodiaceæ* (chenopods). *Beta vulgaris*, or common beet, is cultivated to be used in the manufacture of sugar, the green topped variety being preferred for the purpose. The small red, the Castelnaudary, and other varieties, are used, either raw or boiled, as salad. Much of the beet root sugar is made, not from the *beta vulgaris*, but from the *B. cicla*, the white beet, called also the chard, or Sicilian beet. (*Cicla*, in the specific name, means Sicilian.)

BEETHOVEN, LUDWIG VAN (bā-tō'ven, or bā'tō-ven), one of the greatest musical composers of modern times, was born in Bonn, in 1770. His genius was very early displayed, and his musical education was begun by his father, and continued by the court organist, who introduced him to the works of Sebastian Bach and Handel. About 1790, he settled in Vienna, where Mozart quickly recognized his marvelous powers. When about 40 years of age, he was attacked with deafness, which lasted through life. He became, gradually, the victim of morbid irritability and hopeless melancholy, ending in confirmed hypochondria, and, finally, dropsy and delirium. He continued to compose, however, long after he had ceased to hear himself play. He died unmarried, in Vienna, March 26, 1827. The works of Beethoven are very numerous, and in every variety of style —orchestral, chamber music, pianoforte and vocal music. Among the most celebrated are the opera of "Fidelio"; the oratorio of the "Mount of Olives"; the cantata "Adelaide"; "Sinfonia Eroica" ("Heroic Symphony"); "Sinfonia Pastorale" ("Pastoral Symphony"); "Concerto in C Minor"; "Sonata Pathétique"; and the "Sonata with Funeral March." Vast power, intense passion, and infinite tenderness are manifested in all his compositions, which abound no less in sweetest melodies than in grand and complicated harmonies. A statue of Beethoven, by Hähnel, was erected at Bonn, in 1845.

BEETLE, any member of the enormously large order of insects called by naturalists *coleoptera*, meaning sheathed wings. They have four wings, the inferior pair, which are membranous, being protected by the superior pair, which are horny.

BEET ROOT, the root of the beet (*beta vulgaris*); a valuable food, owing to a large amount of sugar it contains. Nearly all the sugar used in France is made from the beet, and in this country many of the sugar refiners use it in their sugar factories. In Germany, a coarse spirit is manufactured from the beet, a large proportion of which is imported into other countries and made into methylated spirit. Beet root contains 10 per cent. of sugar, and about 2 per cent. of nitrogenous matters. It was formerly used to adulterate coffee.

BEET SUGAR, the sugar obtained from the beet; similar to cane sugar; but inferior in sweetening power. Beet root contains an average of about 10 per cent. of saccharine matter; sugar cane, 18 per cent. Of the varieties, the white Slevig beet is the richest.

The beet sugar industry was started by Marggraf, in Germany, in 1747, who was the first to discover that sugar could be extracted from the common beet. The first factory for its manufacture was erected by Achard, at Kunern, in Silesia, in 1802. Napoleon issued an imperial decree in the early part of his reign establishing this industry in France. In 1830, attempts were made in the United States to introduce the cultivation of the sugar beet. It was not, however, till 1876 that the first successful beet sugar factory was built, being erected in Alvarado, Cal. Others soon followed and the business has now become an important industry.

The following shows the production of beet sugar in Europe, as officially reported for 1919-1920 (in tons of 2,240 pounds):

Germany	750,000
Czecho-Slovakia	535,000
France	154,444
Russia and Poland	225,000
Belgium	144,662
Holland	236,277
Other countries	630,666
Total in Europe	2,676,049

The following shows the production of beet sugar in the United States, as officially reported for 1919 (in tons of 2,000 pounds):

California	131,172
Colorado	193,890
Idaho	26,159
Michigan	130,385
Nebraska	60,870
Ohio	31,864
Utah	101,025
Wisconsin	10,636
Other States	40,450
Total for United States	726,451

BEGAS, REINHOLD, a German sculptor, born in 1831. He studied in Germany and in Rome. His work cre-

ated immediate attention and was considered to mark a new era of sculpture in Germany. Among his most important monuments were those to Frederick William III. at Cologne, the Schiller monument in Berlin, Fountain of Neptune, monument to Bismarck, and a marble statue of Emperor William II. He also made many portrait busts and other works. He died in 1911.

BEGGAR, one whose habitual practice is to implore people for alms, whether because he has some physical or mental defect which wholly or partially incapacitates him from working; or because he is too idle to work.

BEGHARDS, BEGUARDS, or **BOGARDS**, various spellings of a name said by some to be derived from their begging favor from God in prayer, and to the fact that they were religious mendicants. Another opinion is that they are named after St. Begghe, whom they took for their patroness.

In general Church history, "the tertiaries" of several monastic orders, Dominicans and Franciscans. In a special sense, the tertiaries of the Franciscans. By the third rule of St. Francis, those might have a certain loose connection with this order, who, without forsaking their worldly business, or forbearing to marry, yet dressed poorly, were continent, prayerful, and grave in manners. In France they were called *Beguini*, and in Italy, *Bizochi*, and *Bocasoti*. They were greatly persecuted by successive Popes.

The name was also applied to certain religious people who associated themselves into a kind of monastic lodging house under a chief, while they were unmarried, retiring when they pleased. As they often supported themselves by weaving, they were sometimes called "Brother Weavers." They first attracted notice in the Netherlands in the 13th century. They were established at Antwerp in 1228, and adopted the third rule of St. Francis in 1290.

BEGONIA, a genus of plants, the typical one of the order *begoniaceæ* (begoniads). Several species are cultivated in greenhouses, in flower pots, in houses, and in similar situations.

BEHAR AND ORISSA, a province in lower Bengal, India, area, 120,000 square miles; constituted in 1912, between Bengal and the Himalayas. Pop. about 40,000,000. Capital, Patna. The chief crops are rice, sugar-cane, corn, and indigo.

BEHISTUN, or **BISUTUN**, a mountain near a village of the same name in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its sides—a rock rising almost perpendicularly to the height of 1,700 feet. These works, which stand about 300 feet from the ground, were executed by the orders of Darius I., King of Persia, and set forth his genealogy and victories. To receive the inscriptions, the rock was carefully polished and coated with a hard, siliceous varnish. Their probable date is about 515 B. C. They were first copied and deciphered by Rawlinson.

BEHN (bān), **APHRA**, or **AFRA**, or **APHARA**, an English author, born in Wye, in 1640. Early in life she spent several years in the West Indies, where she met the Indians, who became the model of her famous "Oroonoko." She was the first woman writer in England who earned a livelihood by her pen. Her dramatic works include "The Forced Marriage" (1671); "The Amorous Prince" (1671); "The Dutch Lover" (1673); "Abdelazar" (1677); "The Rover" (1677); "The Debauchee" (1677); "The Town Fop" (1677); "The False Count" (1682). She also wrote "Poems" (1684); etc. She died in London, April 16, 1689.

BEHRING, another spelling of BERING (*q. v.*).

BEHRING, EMIL ADOLPH VON, a German bacteriologist, born at Hansdorf, Prussia, in 1854. He studied medicine in Berlin and for a time served as army surgeon. In 1890 he became assistant to Koch in the Institution for Infectious Diseases. He carried on studies in disinfectants and bacterial toxins. These led to the production of diphtheria antitoxin. In 1894 Behring became professor of hygiene at the Halle University, but in the following year was given charge of the Institute for Hygienic Research at Marburg University. He received the Nobel Prize for medicine in 1901. In his later years he devoted much attention to tuberculosis and developed an antitoxin which rendered cattle immune. Following this he developed a method of inoculation against diphtheria. He wrote several volumes on medical subjects. He died in 1917.

BEIRA (bā-ē-ra′), a province of Portugal, between Spain and the Atlantic, and bounded by the Douro on the N., and by the Tagus and Estremadura on the S. Area, 9,208 square miles. Pop. about 1,700,000. Chief town, Coimbra (pop. about 20,000). It is mountainous and well watered, and productive of wine and olives.

BEIRUT. See BEYRUT.

BEJAPOOR, or BIJAPUR, a ruined city of Hindustan, in the Bombay presidency, near the borders of the Nizam's dominions, on an affluent of the Krishna. It was one of the largest cities in India until its capture by Aurungzebe in 1686. The ruins, of which some are in the richest style of Oriental art, are chiefly Mohammedan, the principal being Mahomet Shah's tomb, with a dome visible for 14 miles, and a Hindu temple in the earliest Brahminical style. Pop. about 27,500.

BELA, the name of four Kings of Hungary belonging to the Arpad dynasty. BELA I., son of Ladislaf, competed for the crown with his brother Andrew, whom he defeated, killed, and succeeded in 1061. He died in 1063, after introducing many reforms. BELA II., the Blind, mounted the throne in 1131, and after ruling under the evil guidance of his Queen, Helena, died from the effects of his vices in 1141. BELA III., crowned 1174, corrected abuses, repelled the Bohemians, Poles, Austrians, and Venetians and died in 1196. BELA IV. succeeded his father, Andrew II., in 1235; was shortly after defeated by the Tartars and detained prisoner for some time in Austria, where he had sought refuge. In 1244 he regained his throne, with the aid of the Knights of Rhodes, and defeated the Austrians, but was in turn beaten by the Bohemians. He died in 1270.

BELASCO, DAVID, an American dramatic author and producer, born in San Francisco in 1859. He graduated from Lincoln College, California, in 1875. His stage career began as manager of Baldwin's Grand Opera House at San Francisco. Removing to New York he became stage manager of the Madison Square Theater in 1880, remaining in that position until 1887. He later managed the Lyceum Theater, becoming owner and manager of the Belasco Theater. He wrote many plays, but is best known as a producer of plays and a trainer of players. Among the well-known artists developed under his management are Mrs. Leslie Carter, Blanche Bates, Henrietta Crosman, David Warfield, and Frances Starr. Plays produced under his management are "Zaza"; "Madame Butterfly"; "Du Barry"; "The Darling of the Gods"; "The Music Master"; "The Girl of the Golden West"; "The Return of Peter Grimm"; and "Tiger Rose." He wrote much on the stage and related topics in current magazines.

BELFAST, a seaport and municipal and parliamentary borough of Ireland (in 1888 declared a city), principal town of Ulster, and county town of Antrim, built on low, alluvial land on the left bank of the Lagan, at the head of Belfast Lough. Ballymacarret, in county Down, on the right bank of the Lagan, is a suburb. The chief Episcopal churches are St. Ann's, Trinity, and St. George's, but the most magnificent is the Roman Catholic, St. Peter's. The chief educational institutions are Queen's College and the theological colleges of the Presbyterians and Methodists. Chief public buildings include the town hall, the county court house, the Commerical Buildings and Exchange, etc. In the suburbs are extensive public parks, and a botanic garden. Belfast Lough is about 12 miles long, and 6 miles broad at the entrance, gradually narrowing as it approaches the town. The harbor and dock accommodation is extensive. Belfast is the center of the Irish linen trade, and has the majority of spinning mills and power loom factories in Ireland. Previous to about 1830 the cotton manufacture was the leading industry of Belfast. The shipbuilding trade is also of importance, and there are breweries, distilleries, flour mills, oil mills, foundries, print works, tan yards, chemical works, rope works, etc. The commerce is large. Some direct trade is carried on with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic, besides the regular traffic with the principal ports of the British Islands. Belfast is comparatively a modern town, its prosperity dating from the introduction of the cotton trade in 1777. It has suffered severely at various times from factional fights betweeen Catholics and Protestants, the more serious having been in the years 1864, 1872, and 1886. It returns four members to Parliament. Pop. (1917) 393,000.

BELFAST, city, port of entry, and county-seat of Waldo co., Me.; at the head of Penobscot Bay, and on the Maine Central railroad; 30 miles from the ocean, and 132 miles N. E. of Portland. It has a fine harbor, a large domestic trade, and important manufactures. The most notable industry is shipbuilding, which was begun here in 1793. There are also a number of other industrial establishments. Belfast was settled in 1770; was invested by the British in 1815, and was given a city charter in 1853. Pop. (1910) 4,618; (1920) 5,083.

BELFAST LOUGH, an inlet in the N. E. of Ireland between counties Antrim

and Down, at the head of which BELFAST (*q. v.*) is situated.

BELFORT, a small fortified town and territory of France, in the former department of Haut Rhin, on the Savoureuse; well built, with an ancient castle and a fine parish church. In the Franco-Prussian war it capitulated to the Germans only after an investment of more than three months' duration (1870-1871). It has since been converted into one of the most formidable fortresses. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin which remained to France on the cession of Alsace to Germany. Pop. about 40,000.

BELFRY, that part of a steeple in which a bell is hung, the campanile; a room in a tower, a cupola or turret in which a bell is, or may be, hung. Also, in the Middle Ages, a tower erected by besiegers to overlook a place besieged.

BELGÆ, the name given by Cæsar to the warlike tribes which in his time occupied that one of the great divisions of Gallia bounded on the N. by the Rhine, on the W. by the ocean, on the S. by the Sequana (Seine) and Matrona (Marne), and on the E. by the territory of the Treviri. Their country was level, containing no mountains of any height, except the Vosges in the S. The name seems to have originally designated several powerful tribes inhabiting the basin of the Seine, and to have been afterward used by Cæsar as a general appellation for all the peoples N. of that river.

BELGIUM, a kingdom of western Europe, consisting of the former Spanish Netherlands. It is situated on the North Sea, between France, Prussia, and Holland. It has an area of 11,373 square miles, and is divided into the following provinces: Antwerp, Brabant, East Flanders, West Flanders, Luxembourg, Liege, Namur, Limbourg, and Hainaut. The country is one of the most densely populated in Europe, having about 650 inhabitants to the square mile. The population is made up chiefly of Flemish and Walloons (of French descent); the two languages are officially recognized now, but, although the Flemish language prevails in half of the provinces, French is understood everywhere, and prevails socially. As to religion, the Roman Catholics predominate. Brussels is the capital of the kingdom. The trade of Belgium prior to the war was prosperous, owing largely to its excellent harbors and the natural productions of the country. Coal, iron, machinery, linen and woolen goods, glass, lace, etc., were the principal articles of export; grain, cattle, and raw material, of import. The kingdom was a part of the old Roman and Frankish dominions; and, since the Middle Ages, has been ruled successively by the Dukes of Burgundy, the Kings of Spain, and the House of Austria. In 1794 the country was ceded by Austria to France; but in 1814 Belgium was united with Holland into the Kingdom of the Netherlands. In 1830, however, the whole country revolted against a union with the Dutch, and the following year Prince Leopold of Saxe-Coburg was elected King of the Belgians. Since that time Belgium's history has been quiet and prosperous. On April 11, 1900, King Leopold presented to the Belgian nation the whole of his vast tracts of real estate, scattered throughout the kingdom, for the purpose of providing ornamental parks for the public. The Kongo Free State is under the personal sovereignty of the King of the Belgians. Leopold died in 1909. Albert, second son of his brother, Philippe Eugene, Count of Flanders, succeeded to the throne. See ALBERT I.; WORLD WAR.

Politically, Belgium is a constitutional, representative, and hereditary monarchy. The executive power is vested in the King (acting through eight responsible ministers), the legislative power jointly in King, Senate, and Chamber of Deputies. The new government that came into power in 1919 declared universal suffrage at the age of 21 years—one man, one vote. Before the European War the priests had four votes, and the landowners and nobles as many as they had estates in different parts of the kingdom. This had enabled the Catholic party to hold power forty years.

The country is divided into two sections; the N. is chiefly agricultural, and the S. industrial. Full religious liberty prevails, and grants are made from the National treasury to all denominations.

Economic Conditions.—In spite of the losses and suffering during the World War, economic conditions in Belgium at its close were more favorable than those of other countries of Europe. The German Government, while it was in control, anticipating the annexation of Belgium, if the war went in favor of Germany, was careful to maintain the industrial plants and railroads practically intact. Only such machinery was removed from the factories as would be immediately useful in Germany. By the terms of the Treaty of Peace, the greater part of the machinery taken away was returned by Germany and was installed as rapidly as possible in Belgian plants, which were thus enabled to turn to operation. As a

notable example of the quick industrial recovery, it may be noted that by September, 1919, the coal production had reached 87 per cent. of what it had been previous to the war. The number of miners actually at work was nearly 100,000. Not only was there enough coal to run the railroads, but Belgium apparently was producing a larger proportion of the pre-war output than any of the other European countries, and it was able to export coal on account of the comparatively small demand of factories, which had only been partially reopened.

While there were strikes and other economic troubles in 1919-1920, these were settled largely through the intervention of the government through arbitration. The labor union leaders were, on the whole, conciliatory, and avoided strikes wherever possible.

The pre-war debt, which amounted to about five billion francs, had been increased in 1919 to a total of nearly twenty billion francs. German indemnities were relied upon for a liquidation of a large part of this war debt. There was payable before May 21, 1921, 2,500,000,000 francs.

The government set about effecting a system of taxation in order to restore the equilibrium of the budget. In April, 1919, a tax on war profits was adopted at rates varying from 20 to 80 per cent. The retirement of the German marks and the complete restoration of the franc was completed in 1919.

By the end of the year exports were being made on a considerable scale, chiefly of coal and beet sugar. Quantities of glass were also exported, as well as matches, yarns, and textiles.

Railways.—The railroads of the country were rapidly restored in 1919. A large part of the moving stock taken by Germany had been returned. By the autumn of 1919 freight traffic was nearly normal.

Army.—At the time of the signing of the armistice, the field army of Belgium amounted to about 204,000 men, including 8,400 officers. It was arranged to relieve this army from service for the month of November, 1919. A new law was passed fixing the effective army at 100,000 on a peace footing, and 320,000 on a war footing. In 1919 the Belgian army consisted of 365,000 soldiers and 14,050 officers.

Belgium in the War.—By an act bearing date 19th April, 1839, signed in London, the perpetual neutrality of Belgium was guaranteed by Austria, France, Great Britain, Prussia, and Russia. This treaty, which was signed by Belgium, bound her to preserve the like neutrality toward the other signatory powers, held her from entering upon a separate political relation with any one of them, and restricted her from calling for aid except in the event any one of them broke the compact and crossed her frontiers.

Not for three-quarters of a century was a single step in violation of this treaty taken, although the war-cloud had been lowering over the principal continental powers for nearly half a century before it finally broke with such fury as threatened to wipe out completely the whole nation.

Simultaneously with the declaration of war on Russia, Aug. 1, 1914, Germany crossed Luxemburg; a principality whose own independence had been guaranteed by her in concert with the other powers by treaty of 11th May, 1867, and ruthlessly invaded Belgium with the main body of its armed force. This was an initial step in the march on Paris, to which they approached within twenty-two miles but a few weeks later.

On Aug. 4 the King of Belgium addressed his Parliament in a stirring speech exhorting the nation to stand firm. On that date the Belgian army had taken a brave stand against an overwhelmingly superior foe along the river Dyle, and in the immediate track of the advance on its principal cities, Antwerp and Brussels. By the afternoon of that day her pickets encountered the German force under Von Emmich, and by half past eleven that night the first cannonading of the greatest war in world history had begun. Three days later Liege was captured by the enemy, after an assault of eleven days, during which she withheld an overwhelming force, and at once made the base of supplies from which the real advance of the invasion of Belgium began. Fighting step by step and making a resistance at which the world wondered considering the superiority of the foe at every possible point, the Belgian army was forced back, and the Germans entered the capital, Brussels, on Aug. 20, within sixteen days of the firing of the first shot. The backbone of Belgian resistance was now broken and the Germans spread out and took possession of almost the entire Kingdom. The government had meanwhile been removed to Antwerp, from whence it fled to Ostend on the sea-coast, and finally set up a provisional entity at Havre, France. But one great objective remained, Antwerp, which was captured Oct. 9, 1915. On Aug. 26 Belgium was formally placed under the iron rule of the conqueror, with Field Marshal Baron Von der Goltz as military governor. The King divided his time between his army and visits to London and Paris.

The capture of Antwerp was a severe blow to the heroic little Belgian army, and almost threatened its utter demoralization. But it gradually rallied under the invincible national spirit, and was indeed increased and reorganized so as to take part in the great battle of the Yser. It thence remained an important factor, in military operations, up to the end of the war. Refugees who had gone over to England, and fled to France, now returned to fight in its ranks.

One of the first acts of Von der Goltz, the German governor, was the levying of heavy contributions on the conquered cities. In addition a program of "frightfulness," as the Germans themselves called it, was inaugurated both in actual conflict and in dealing with the people. From October, 1916, to the end of January, 1917, 120,000 Belgians were deported to Germany. Public protests and the voice of neutrals lessened the outrage thereafter in Belgium, although it continued along the German front in France.

The Rockefeller Relief Commission began an organized movement in February, 1915, for the agricultural restoration of the devastated country in Belgium and northern France. It was estimated that the total loss in agricultural districts in Belgium alone was some two hundred and eighty millions. A world-wide conference held in London a little later suggested a plan for the restoration of the country after the war. Stimulated and perhaps shamed by such endeavor, the German Government in Belgium itself began to undertake some practical measures for the relief of the people. It promised also safe conduct for American vessels laden with supplies. By September the United States had contributed six million dollars in money, clothes, and food.

The execution of Edith Cavell, which took place in October, 1915, also aroused international indignation, and must be referred to as one of the outstanding incidents of the Belgian campaign. Miss Cavell, an English nurse in charge of a training school at Brussels, was accused of assisting in the escape of prisoners from the country. After a brief confinement she was condemned to be shot by a squad of soldiers. Only one bullet struck and wounded her when the German officer in charge of the firing-squad drew his revolver and shot her dead. English feeling was aroused to a tremendous pitch and the execution was one of the greatest incitements to outside feeling against Germany of the whole war.

So far as regards the general administration of the country under German rule, however, it must be conceded that so soon as it became thoroughly settled under Von Bissing more moderate measures were adopted, at least tentatively. In March, 1915, General Von Bissing proclaimed that he was anxious to restore self-government to local communities and social welfare organizations, and that the German Red Cross was to be engaged in preventive work against prostitution, contagious diseases, and infant mortality.

The other chief feature of German governmental policy was an effort to put the whole situation upon at least a self-supporting basis. To this end heavy taxes, especially on absentee landowners, were promptly imposed. Nov. 13, 1915, proclamation of a monthly war-tax of 40,000,000 francs was made. To restore the industrial situation in the interests of the conqueror, a penalty was imposed on all Belgians who refused to return to their former trade, with severe punishment for any attempt to hinder them. Even destitution from any refusal to labor was punished. Penalties were also enacted against any attempt to boycott or hinder German goods from sale in Belgium. Several decrees against the unemployed were issued in the course of 1915, and strong measures were used by the Germans to wring every ounce of man-power in the country out of it.

The Belgian army in 1916 was assigned to defend a part of the western frontier. They had flooded their position from the river Yser and the Yser Canal so that their chief contact with the enemy was through the artillery. The little army had been reorganized and equipped by its allies, who supplied them with heavy guns for the defense, and it was fully bearing its part. Meanwhile a cavalry arm was being drilled in France for later opportunity. To the infantry had been given the charge of the water-defenses, the dykes forming the first line.

The Belgian army bore its full part in the great fall offensive of 1918 which struck the decisive blow to Germany. It had the satisfaction of aggressive return warfare on its home soil and co-operated in the restoring of Bruges, Zeebrugge, and Ostend to the crown, and later in driving the enemy from Flanders. By the latter part of October the German forces of occupation were in full retreat, and King Albert made a triumphal entry into Ghent Nov. 13, reaching his capital Nov. 22.

Under the Peace Treaty Germany was bound in advance to conform to any changes in the original treaty of 1839 which the Allies might decide to make. The borders of Belgium were to be enlarged by recognition of her sovereignty

over contested Moresnet, over part of Prussian Moresnet, and the circles of Eupen and Malmedy on the Prussian frontier. Germany was required to give a ten-year option for the delivery of 8,000,000 tons of coal annually to pay all debts incurred by the country to her allies up to Nov. 11, 1918, and to restore her art treasures. A decision of the Peace Conference June 24, 1919, allotted to Belgium the first payment from the German indemnities amounting to $500,000,000. Her condition at the signing of the armistice was almost unspeakable. Unquestionably no conquered country in the whole history of modern warfare had so suffered at the hands of a foe. All of her important cities, with the sole exception of Antwerp and Brussels, had been devastated, and the whole country, despite German promises and protestations, had been systematically harried, exploited, and ruined. An idea of the extortions of the Germans may be gained from the fact that the monstrous initial war tax of 40,000,000 francs imposed on the hopelessly paralyzed nation in 1915 was gradually raised to 60,000,000 and an attempt was made to increase it to 75,000,000 in 1918. Special taxes of 50,000,000 francs on Antwerp, 20,000,000 on Liege, 2,000,000 on Tournai were imposed. The country was bled, starved, destroyed, and but for the heroic work of the American Relief Commission would have become utterly disintegrated by the close of the war.

For months after the signing of the armistice there seemed little prospect of a normal return to common trade conditions. Of her sea-going ports only one —Antwerp—was not ruinously damaged. By the end of the year a few articles of the foremost necessity began to come in. The losses to the railway system alone during the four years of war were $275,000,000. There is little doubt in summing up the whole record that Germany regarded the stubborn resistance of the heroic little Belgian army at the outset as the reason for her failure to reach the French capital, and that the severity of her treatment of the prostrate country was the result of rage and resentment. See WORLD WAR.

Elections were held in December, 1919. As a result the new Chamber was constituted as follows: Catholic, 77; Socialists, 67; Liberals, 33; Flemish "Activists," 3; Middle Class Representatives, 2; Representatives of Combatants, 3; Nationalist Party, 1. The Socialists gained 27 seats, while the Catholics lost 24, and the Liberals lost 12.

The Olympic games were held in Antwerp in August, 1920.

BELGRADE, a city and capital of Serbia, on the right bank of the Danube in the angle formed by the junction of the Save with that river, consists of the citadel or upper town, on a rock 100 feet high; and the lower town, which partly surrounds it. Of late years buildings of the European type have multiplied, and the older ones suffered to fall into decay. The chief are the royal and episcopal palaces, the government buildings, the cathedral, barracks, bazars, National theater, and various educational institutions. Pop. about 91,000. It manufactures carpets, silk stuffs, hardware, cutlery, and saddlery; and carries on an active trade. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks, remaining, however, for the most part, in the hands of the Turks until its evacuation by them in 1867. As a result of the treaty of Berlin (July, 1878) it became the capital of Serbia. In the World War (1914-1918) Belgrade suffered heavily from bombardments by the Austrians in 1914-1915-1916. The Austrians captured it twice and were driven out by Serbian troops, but with the help of Germans and Bulgars held it from the third year of the war to the close. See SERBIA; WORLD WAR.

BELGRAVIA, a fashionable residence district in the S. part of the W. end of London, bordering on Hyde Park and Buckingham Palace Gardens. The word is derived from Belgrave Square, in the center of that quarter, and has its name from one of the titles of the Duke of Westminster, who owns the whole district.

BELIAL, a word which by the translators of the English Bible is often treated as a proper name, as in the expressions "son of Belial," "man of Belial." In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated wickedness or worthlessness. To the later Jews Belial seems to have become what Pluto was to the Greeks.

BELISARIUS, the great general of the Roman Emperor Justinian, was a native of Illyria. He commanded an expedition against the King of Persia about 530; suppressed an insurrection at Constantinople; conquered Gelimer, King of the Vandals, and put an end to their dominion in Africa; was recalled and honored with a triumph. In 535, Belisarius was sent to Italy to carry on a war with the Goths, and took Rome in 537. Belisarius recovered Rome from Totilus in 547, and was recalled the next year. He was afterward sent against the Huns.

He was charged, in 563, with conspiracy against Justinian, but was acquitted. He died in 565.

BELIZE, or BRITISH HONDURAS, a British colony, washed on the E. by the Bay of Honduras, in the Caribbean Sea, and elsewhere surrounded by Guatemala and Mexico. It forms the S. E. part of the peninsula of Yucatan, and measuring 180 by 60 miles, has an area of 8,592 square miles. The river Belize traverses the middle of the country, and the Rio Hondo and the Sarstoon form respectively its N. W. and its S. boundary. The Cockscomb Mountains (4,000 feet) are the highest eminences, the land all along the coast being low and swampy. The country has a general tropical fertility; its chief exports are mahogany and logwood, besides sugar, coffee, cotton, sarsaparilla, bananas, plantains, and india rubber. The early settlers were buccaneers, then logwood cutters, who were frequently attacked by the Spaniards, but since 1798, when they repulsed a fleet and a land force, their occupation has been formally acquiesced in. Since 1862 Belize has ranked as a British colony, with a lieutenant-governor, whose rank was raised, in 1884, to that of governor. Pop. about 42,000. Belize, the capital, is a depot for British goods for Central America. Pop. about 11,000.

BELKNAP, GEORGE EUGENE, an American naval officer, born in Newport, N. H., Jan. 22, 1832; was appointed midshipman in the navy in 1852; became Lieutenant-Commander in 1862; Commander in 1866; Captain in 1872; Commodore in 1885, and Rear-Admiral in 1889; and was retired in 1894. He took part in the capture of the Barrier Forts on the Canton river, China, in 1856; and in the Civil War was present at the bombardment of the forts and batteries in Charleston harbor, and in both of the attacks on Fort Fisher. In 1873, while engaged in deep sea sounding in the North Pacific Ocean, he made discoveries concerning the topography of the bed of the ocean that found high favor among scientists. He was appointed Superintendent of the United States Naval Observatory in 1885, and, among other works, published "Deep Sea Soundings." He died April 7, 1903.

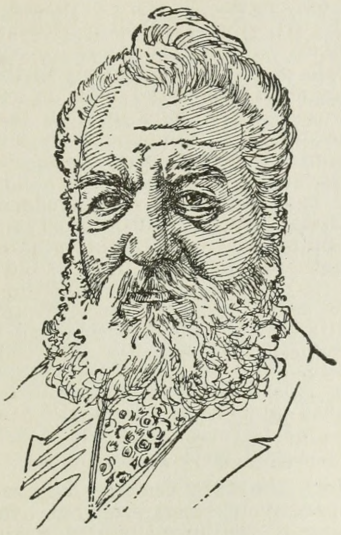
BELL, a hollow, sounding instrument of metal. The metal from which bells are usually made (by founding) is an alloy, called bell-metal, commonly composed of 80 parts of copper and 20 of tin. The proportion of tin varies, however, from one-third to one-fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the body or barrel, the ear or cannon, and the clapper or tongue. The lip or sound bow is that part where the bell is struck by the clapper.

Bells were used very early in the form of cymbals and hand bells in religious services. They were used in the early monasteries to announce the hours of prayer. Generally they were made of tubes, struck with a hammer. They are said to have been first introduced into Christian churches about 400 A. D., by Paulinus, Bishop of Nola in Campania (whence campana and nola as old names of bells); although their adoption on a wide scale does not become apparent until after the year 550, when they were introduced into France. The oldest of those existing in Great Britain and Ireland, such as the "bell of St. Patrick's well" and St. Ninian's bell, are quadrangular and made of thin iron plates hammered and riveted together.

Until the 13th century they were of comparatively small size, but after the casting of the Jacqueline of Paris (6½ tons) in 1400, their weight rapidly increased. Among the more famous bells are the bell of Cologne, 11 tons, 1448; of Danzig, 6 tons, 1453; of Halberstadt, 7½, 1457; of Rouen, 16, 1501; of Breslau, 11, 1507; of Lucerne, 7½, 1636; of Oxford, 7½, 1680; of Paris, 12 4/5, 1680; of Bruges, 10¼, 1680; of Vienna, 17¾, 1711; of Moscow (the monarch of all bells), 193, 1736; three other bells at Moscow, ranging from 16 to 31 tons, and a fourth of 80 tons, cast in 1819; the bell at Lincoln (Great Tom), 5½, 1834; of York Minster (Great Peter), 10¾, 1845; of Montreal, 13½, 1847; of Westminster (Big Ben), 15½, 1856; (St. Stephen), 13½, 1858; the great bell of St. Paul's, 17½, 1882. Others are the bells of Ghent (5), Görlitz (10¾), St. Peter's, Rome (8), Antwerp (7¼), Olmütz (18), Brussels (7), Novgorod (31), Pekin (53½). See BELL, LIBERTY.

Bells, as the term is used on shipboard, are the strokes of the ship's bell that proclaim the hours. Eight bells, the highest number, are rung at noon and every fourth hour afterward, *i. e.*, at 4, 8, 12 o'clock, and so on. The intermediary periods are indicated thus: 12:30, 1 bell; 1 o'clock, 2 bells; 1:30, 3 bells, etc., until the eight bells announce 4 o'clock, when the series recommences 4:30, 1 bell; 5 o'clock, 2 bells, etc. The even numbers of strikes thus always announce hours, the odd numbers half hours.

BELL, ALEXANDER GRAHAM, inventor of the telephone, was born in Edinburgh, March 3, 1847. He was educated in Edinburgh and in Germany, and settled in Canada in 1870. In 1872 he



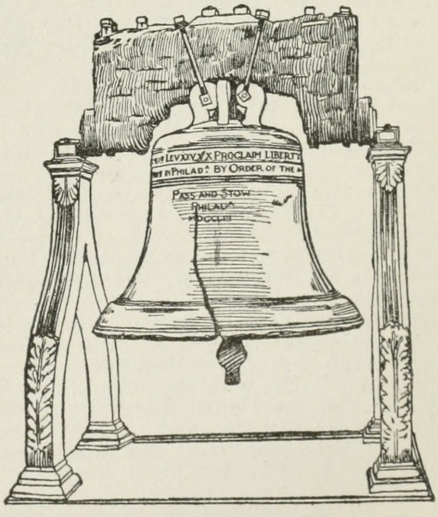
ALEXANDER GRAHAM BELL

went to the United States and introduced for the education of deaf mutes the system of visible speech contrived by his father. He became Professor of Vocal Physiology in Boston University, and at the Philadelphia Exhibition, in 1876, exhibited his telephone, designed and partly constructed some years before. He was also the inventor of the photophone in 1880, of the graphophone in 1887, and of kindred instruments. He made many improvements to tetrahedral kites and in aerial locomotion for the Aerial Experiment Association (1903-1908). Gold and silver medals and degrees from the leading scientific associations and universities of Europe and the United States have been awarded to him. In 1887 he founded and endowed the Volta Bureau for Relief of the Deaf, in 1900 the American Association to Promote the Teaching of Speech to the Deaf. Regent of Smithsonian Institution since 1898. In 1904 he brought to the U. S. the remains of James Smithson from Genoa, Italy.

BELL, JAMES FRANKLIN, an American soldier, born in Shelbyville, Ky., in 1856. He graduated from West Point in 1878 and for several years served in the West with the 7th Cavalry. He fought in the Spanish-American War and in the Philippines, and in 1889 was awarded the Congressional Medal of Honor. From 1906 to 1910 he was Chief of Staff of the United States Army, and from 1911 to 1914 he was commander of the Philippine Division. He commanded the 2d Division of the United States Army in Texas from 1914 to 1915 and from the latter year until 1917 was commander of the Western Department. He was appointed commander of the 77th Division in the National Army in 1917, and for a time commanded this division in France. He died in 1919.

BELL, JOHN, an American statesman, born near Nashville, Tenn., Feb. 18, 1797; was admitted to the bar in 1816; member of Congress from 1827 to 1841; Speaker in 1834, and Secretary of War in 1841. During this period he changed from an ardent free trader to a protectionist and supporter of the Whigs, and favored the reception of petitions for the abolition of slavery in the District of Columbia; afterward (1858) he vigorously opposed the admission of Kansas as a slave State. He sat in the United States Senate from 1847 to 1859, and, in 1860, was nominated for the Presidency by the "Constitutional Union" party, but received only 39 electoral votes, cast by the States of Tennessee, Kentucky, and Virginia. He died at Cumberland Ironworks, Sept. 10, 1869.

BELL, LIBERTY, a famous bell which was rung when the Continental Congress



THE LIBERTY BELL, INDEPENDENCE HALL, PHILADELPHIA, PA.

declared the independence of the United States in 1776. The order for founding it was given in 1751. The State House of Pennsylvania, in Philadelphia, work

on which had been suspended for a number of years, was then approaching completion. The lower floors were already occupied by the Supreme Court in the Chamber, while in the other assembled the Freemen of the Province of Pennsylvania, then consisting of one body. A committee was appointed by the Freemen, with Peter Norris as chairman, and empowered to have a new bell cast for the building. The commission for the bell was, in the same year, awarded to Robert Charles, of London, the specification being that the bell should weigh 2,000 pounds and cost £100 sterling. It was to be made by the best workmen, to be examined carefully before being shipped, and to contain, in well shaped letters around it, the inscription: "By order of the Province of Pennsylvnia, for the State House in the City of Philadelphia, 1752." An order was given to place underneath this the prophetic words from Leviticus xxv: 10: "Proclaim liberty throughout the land and to all the inhabitants thereof." The reason for the selection of this text has been a subject of much conjecture, but the true reason is apparent when the full text is read: It is as follows: "And ye shall hallow the 50th year and proclaim liberty throughout the land and to all the inhabitants thereof." In selecting the text the Quakers had in memory the arrival of William Penn and their forefathers more than half a century before. In August, 1752, the bell arrived, but though in apparent good order, it was cracked by a stroke of the clapper while being tested. But it was also defective. It was again recast and a success, and was placed in position in June, 1753. On Monday, the 8th of July (not the 4th), at noon, true to its motto, it rang out the memorable message of "Liberty throughout the land and to all the inhabitants thereof." For 50 years the bell continued to be rung on every festival and anniversary, until it eventually cracked. Subsequently, it was placed on the original timbers in the vestibule of the State House, and, in 1873, it was suspended in a prominent position immediately beneath a larger bell, presented to the city in 1866. In 1893 it was taken to Chicago and placed on exhibition at the World's Columbian Exposition, and in 1915 to the Pan-Pacific Exposition, San Francisco.

BELLADONNA, a European plant, *atropa belladonna*, or deadly nightshade, natural order *solanaceæ*. It is native in Great Britain. All parts of the plant are poisonous. The inspissated juice is commonly known by the name of extract of belladonna. It is narcotic and poisonous, but is of great value in medicine, especially in nervous ailments. It has the property of causing the pupil of the eye to dilate. The fruit of the plant is a dark, brownish-black shining berry.

BELLAIRE, a city in Belmont co., O.; on the Ohio river, and several railroads; 5 miles S. of Wheeling, W. Va. The river is here crossed by a costly iron railroad bridge. Bellaire is the center of a region rich in coal, iron, cement brick, clay, and limestone, and has manufactories of stoves, glass, carriages, boilers, and foundry and machine shop products. The city has a National bank, high grade educational institutions, daily and weekly newspapers, etc. Pop. (1910) 12,946; (1920) 15,061.

BELLEAU WOOD, a forest in the vicinity of Château-Thierry, France, notable for a victory won there on July 6, 1918, by American marines and soldiers. The wood was dense and heavily fortified and was defended by strong forces of Germans, but the Americans won a signal victory. See WORLD WAR.

BELLEFONTAINE, a village and county-seat of Logan co., O.; on the Cleveland, Cincinnati, Chicago and St. Louis, and on the Toledo and Ohio Central railroads; 57 miles N. E. of Dayton. It occupies the highest elevation in the State and is surrounded by an agricultural region. There are extensive car shops, round house, switch yard, etc., of the "Big Four" railroad and numerous manufacturing plants. The village has two National banks; several daily and weekly newspapers. Pop. (1910) 8,238; (1920) 9,336.

BELLE-ISLE (bel-ēl), or **BELLE-ISLE-EN-MER**, a French island in the Bay of Biscay, department of Morbihan, 8 miles S. of Quiberon Point; length, 11 miles; greatest breadth, 6 miles. Pop. about 10,000, engaged in the pilchard fishing. The capital is Le Palais, on the N. E. coast.

BELLE-ISLE, a rocky island 9 miles long, at the E. entrance to the Strait of Belle-Isle, the channel, 17 miles wide, between Newfoundland and the coast of Labrador. Steamers from Glasgow and Liverpool to Quebec around the N. of Ireland commonly go by this channel in summer as being the shortest route. There are two lighthouses.

BELLES-LETTRES (bel-let'r), polite, or elegant literature: a word of somewhat vague signification. Rhetoric, poetry, fiction, history, and criticism, with the languages in which the standard works in these departments are written,

are generally understood to come under the head of *belles-lettres.*

BELLEVILLE, city and county-seat of St. Clair co., Ill.; on several railroads; 14 miles E. of St. Louis, Mo. It is in the midst of very productive coal mines; has a large trade in flour, and general produce; and is chiefly engaged in the manufacture of glass, stoves, flour, nails, and machinery. The city has trolley lines to St. Louis, a public library, St. Peter's Cathedral (Roman Catholic), convent, National bank, etc. Pop. (1910) 21,122; (1920) 24,823.

BELLEVILLE, a town of New Jersey in Essex co. It is on the Passaic river, the Morris canal, and the Erie railroad. It is connected by electric roads to Newark, of which it is a suburb. It has manufactures of rubber goods, dynamos, brass, copper, chemicals, etc. The town has an Elks' Home and a public library. Pop. (1910) 9,891; (1920) 15,660.

BELLEVILLE, town, port of entry, and county-seat of Hastings co., Ont., Canada; on the Bay of Quinte, at the mouth of the Moira river; and on the Grand Trunk and Midland railways; 60 miles W. of Kingston. It has an excellent harbor, and abundant water power; it is in direct steamboat communication with many United States and Canadian points; is principally engaged in manufacturing and commerce; and is a popular summer resort. Belleville is the seat of Albert University (Methodist Episcopal), which comprises Albert College for men, and Alexandra College for women; and in the suburbs is a large deaf and dumb asylum. The city has agencies for the principal banks of Canada; about a dozen churches, convent, and daily and weekly newspapers. Pop. about 10,000.

BELLEVUE, a city of Kentucky in Campbell co. It is on the Chesapeake and Ohio railroad. It has important industries, the chief of which are the quarrying of sand and gravel. Pop. (1910) 6,683; (1920) 7,379.

BELLEVUE, a city of Ohio, in Huron and Sandusky cos. It is on the Pennsylvania, the Lake Shore and Michigan Southern, the New York, Chicago and St. Louis, and the Wheeling and Lake Erie railroads. It is the center of an important agricultural region. It has quarries of limestone, lumber yards, manufactories of agricultural implements, stoves, etc. There is a library and a hospital. Pop. (1910) 5,209; (1920) 5,776.

BELLEVUE, a borough of Pennsylvania in Allegheny co. It is on the Pittsburgh, Ft. Wayne, and Chicago railroad, and on the Ohio river. It adjoins Pittsburgh, of which it is a suburb. There is a large hospital and a memorial park. Pop. (1910) 6,323; (1920) 8,198.

BELLIGERENT. When two sovereign states (nations) are at war with each other, both are "belligerents" under international law and are recognized by neutral states as possessing certain privileges technically known as "belligerent rights." Where one of the parties to the war is not a state, but a group or faction in revolt against the government of its parent state, the revolting faction does not acquire the status of belligerency and become entitled to belligerent rights merely through the fact of being engaged in war. Whether this status is accorded, either by the parent state or by other states, depends upon many conditions. The parent state will in most cases accord it reluctantly, if at all. Other states will in general be guided by considerations of their own interest and convenience and will as a rule insist upon certain conditions, of which the following are the most important: The revolting faction must have established a stable government able to maintain order within the territory under its control; the objects sought by this government must be political, not personal; hostilities must be carried on in accordance with the rules of civilized warfare; the proportions of the revolt must be such as to justify belief in its possible success. Even when all of these conditions exist, a neutral state friendly to the parent state will be slow to recognize the revolting faction as a belligerent unless its own interests are threatened; as for example, in cases where the field of hostilities is near the border of the neutral state, or where the war includes operations at sea covering the routes of neutral commerce.

A neutral state, having decided to recognize a revolting faction as a belligerent, usually gives formal notice of such recognition by issuing a proclamation defining the new attitude which it proposes to assume toward the parties to the war. This attitude having been announced, the following belligerent rights result, so far as the recognizing state is concerned:

1. The right to establish and maintain a blockade.
2. The right for vessels of war of the belligerent to visit merchant vessels of the neutral on the high seas, to examine their papers, and to search for contraband of war. This is tech-

nically known as the right of "visit and search."

3. The right for vessels of war of the belligerent to enter the harbors of the neutral state, subject to certain limitations as to length of stay and the kind and quantity of supplies that may be received.

As a general rule, not more than three vessels of war of a belligerent are permitted in a neutral port at one time. The length of stay is limited to twenty-four hours except where the weather or the condition of the ships makes it unsafe to put to sea. If vessels of war of both belligerents are in a neutral harbor simultaneously, a period of not less than twenty-four hours must elapse after the departure of one of these before the other is permitted to depart. Only sufficient supplies of fuel may be taken to enable the belligerent ship to reach the nearest home port. Only such repairs may be made as are necessary to make the vessel seaworthy.

A belligerent vessel of war which remains in a neutral port beyond the prescribed time limit thereby loses the right to leave the port during the continuance of the war and must be prevented from leaving by disabling the machinery or by other effective steps taken by the neutral authorities. Such a ship is technically "interned."

Belligerents are required by international law to respect the neutrality of other powers by complying loyally with all of the above requirements, and, in general, by refraining, in neutral territory or neutral waters, from all acts which could subject the neutral government to the charge of failing in its duty toward the other belligerent. No act of hostility can be performed within the waters of a neutral, which waters extend to a line three miles off the coast, nor can the right of visit and search be exercised in such waters.

The status of a revolting faction which has not yet been recognized as a belligerent is that of "insurgency," and the recognition accorded at this stage goes no farther than is essential for the transaction of absolutely necessary business; such, for example, as arranging for the security of the life and property of foreign citizens resident within the territory controlled by the insurgent authorities. The privileges which may be accorded to insurgents are not clearly defined, nor is the practice uniform. It is certain that insurgent ships have no right of "visit and search," and no right to enter neutral ports. Nor may they blockade the ports of the parent state even when, as in the case of the Brazilian insurgents in 1893, they have control of the entire navy of the state. On the other hand, the parent state is not in a position to blockade the insurgent ports. In the nature of the case, a sovereign state cannot blockade itself, and so long as the war is held to be merely an insurrection, the ports controlled by the insurgents are theoretically subject to the laws of the state itself, not to international law. And blockade is a function of international, not of municipal, law. At the beginning of the American Civil War, in 1861, the Federal Government declared a blockade of the Confederate ports, thereby inadvertently recognizing the Confederacy as a belligerent power; and Great Britain and other European powers immediately accorded the same recognition, in spite of protests from the United States Government.

It sometimes happens that the parent state recognizes the belligerency of an insurgent faction for the purpose of relieving itself of responsibility for the actions of the insurgents. So long as the state maintains that the struggle going on within its borders is merely an insurrection, *not* a war, just so long the state remains responsible to the world for damage done to other powers by the insurgents. With the recognition of belligerency by the parent state, this responsibility ceases. Similarly, if the parent state refuses recognition but other states grant it, the responsibility ceases for damage suffered by such states but not for states which have not granted recognition.

It is sometimes stated, even by authorities on international law, that insurgents have no standing in law and that they are subject to treatment as pirates and outlaws. This view cannot be maintained. Their rights, although limited and undefined, are real, and unquestionably include the right to treatment in accordance with the laws of war so long as they themselves observe these laws.

The recognition of *belligerency* is a very different thing from the recognition of *independence*. The two may go together, but whereas the recognition of independence carries with it that of belligerency, the converse is far from being the case. Belligerency without independence gives no right to diplomatic representation at a foreign capital, although envoys are sometimes informally received as a matter of convenience.

BELLINGHAM, a city of Washington, the county-seat of Whatcom co. It is about 100 miles N. of Seattle, on the Great Northern, the Northern Pacific,

and the Bellingham and Northern railroads. It is the site of an important station for the United States Navy. There is a State normal school, high schools, libraries, and hospitals. The city has large lumber interests, and salmon canning is also carried on on a large scale. It is a port of entry for vessels of the Oriental and Pacific coast trade. Pop. (1910) 24,298; (1920) 25,570.

BELLINI (bel-lē'nē), the name of a Venetian family which produced several remarkable painters. The earliest was JACOPO BELLINI, who died in 1470. He was a pupil of the celebrated Gentile da Fabriano, and one of the first who painted in oil. His eldest son, GENTILE BELLINI, born in 1421, died in 1501, was distinguished as a portrait painter, and also as a *medailleur*. Along with his brother, he was commissioned to decorate the council chamber of the Venetian Senate. Mohammed II. invited Gentile to Constantinople, employed him to execute various historical works, and dismissed him laden with presents. The "Preaching of St. Mark" is his most famous piece. His more celebrated brother, GIOVANNI BELLINI, born in 1426, died in 1512, was the founder of the older Venetian school of painting, and contributed greatly to its progress. His best works are altar pieces. His picture of the "Infant Jesus" slumbering in the lap of the Madonna, and attended by angels, is full of beauty. His "Holy Virgin," "Baptism of the Lord," and "Christ and the Woman of Samaria," are also much admired.

BELLINI, VINCENZO, a musical composer, born in Catania, in Sicily, in 1802. He was educated at Naples, under Zingarelli, and, before he had completed his 20th year, he had produced "Bianca and Fernando" at the Theater St. Carlo. This was succeeded by various other operas, of which "Il Pirata," "La Sonnambula," "Norma," and "I Puritani" (1827-1834), are the best, and have gained for him an undying celebrity. He died near Paris, Sept. 23, 1835.

BELLINZONA, a town of Switzerland, capital of the canton of Ticino; charmingly situated on the left bank of the Ticino, about 5 miles from its embouchure in the N. end of Lago Maggiore. It occupies a position of great military importance.

BELLOC, HILAIRE, author and publicist, born in La Celle St. Cloud, France, July 27, 1870. Although of French birth and parentage, he was educated at Balliol College, Oxford, and has spent most of his life in England. From 1906 to 1910 he was a Liberal member of the British Parliament from Salford. His knowledge of books, places, and men is almost encyclopedic, and his writings command respect and attention. He has written many books and lectured extensively. During the World War his work as a military critic and commentator placed him in the foremost rank of publicists.

BELLONA, the goddess of war, and sister or wife, or sister-wife and charioteer of Mars. The Romans paid great adoration to her. The Temple of Bellona in Rome stood in the Circus Flaminius, near the Porta Carmentalis, and was the place where foreign ambassadors and generals returning from their campaigns were received by the Senate. Before its gates was raised a column, called Columna Bellica, against which a javelin was hurled as one of the previous forms in the declaration of war. Her priests were named after her, Bellonarii.

BELLOT STRAIT, the passage on the N. coast of North America, which separates North Somerset from Boothia Felix, and connects Prince Regent Inlet with Franklin Channel. Its E. entrance was discovered in 1853 by Lieut. Joseph René Bellot. After four unsuccessful attempts, it was explored for the first time by M'Clintock on his crowning voyage. It is about 20 miles long, and, at its narrowest part, about 1 mile wide, running pretty nearly on the parallel of 72°, between granite shores which, everywhere high, rise here and there to 1,500 or 1,600 feet. Through this funnel both the winds and the waters have full play; the latter, permanent currents and flood tides alike, coming from the W. A point on the S. shore, 71° 55′ N., 95° W., is the most northerly point of the North American continent.

BELLOWS, GEORGE WESLEY, an American artist, born in Columbus, O., in 1882. He graduated from the Ohio State University in 1905 and afterward studied art under Robert Henri. His pictures were exhibited at exhibitions in Venice and other cities. He received the second Hallgarten prize in 1908, and the first Hallgarten prize in 1913. He was awarded the Maynard prize of the National Academy of Design in 1914. He also received other prizes from art societies and institutions. He was a member of the National Academy. His pictures are found in many leading galleries of the United States and abroad.

BELL ROCK, or INCH CAPE, a dangerous reef surmounted by a lighthouse, situated in the German Ocean, about 12

miles from Arbroath, nearly opposite the mouth of the river Tay. The lighthouse was erected in 1808-1811 by Robert Stevenson from Rennie's plan at a cost of upward of £60,000. It arises to a height of 120 feet; has a revolving light showing alternately red and white every minute, and visible for upward of 15 miles. It also contains two bells which are rung during thick weather.

BELMONT, AUGUST, an American banker, born in Alzey, Germany; educated at Frankfort, and was apprenticed to the Rothschild's banking house there. In 1837 he went to Havana to take charge of the firm's interests, and afterward represented them in New York, where he established a banking house. He was Consul-General of Austria in 1844-1850; became Chargé d'Affaires at The Hague in 1853; and was Minister-Resident there in 1854-1858. He was a delegate to the Democratic National Convention in 1860, and became Chairman of the National Democratic Committee, an office he held till 1872. He died in New York City, Nov. 24, 1890.

BELMONT, AUGUST, an American banker, born in New York City, Feb. 18, 1853; son of the preceding. He was graduated at Harvard University in 1875; at once entered his father's banking house, and on the death of his father became head of the firm of August Belmont & Co. In February, 1900, he organized the Rapid Transit Subway Construction Company to back John B. McDonald, who had been awarded the $35,000,000 contract for the construction of a rapid transit system in New York City. He was president of the National Civic Federation (1905-1906); chairman Interborough Consolidated Corporation and Interborough Subway Construction Co. (1911); and a director in numerous other companies. He has taken an active interest in politics on the Democratic side, acting at times as treasurer of the National Committee. He was chairman of the Jockey Club and one of the most active and prominent supporters of horse racing and breeding in the United States. In 1910 he married Eleanor Robson, a well-known Anglo-American actress.

BELMONT, PERRY, an American lawyer, born in New York, Dec. 28, 1851; son of August Belmont; graduated at Harvard University in 1872, and at Columbia College Law School in 1876; was admitted to the bar and practiced in New York till 1881, when he was elected as a Democrat to Congress, and served till 1887, being a member of the Committee on Foreign Affairs. In 1885 he was appointed Chairman of the Committee on Foreign Affairs, and in 1888 United States Minister to Spain. In 1889 he was a Commissioner to the Universal Exposition in Paris. He was one of the principals in the execution of the great contract for the construction of a rapid transit system in New York City, February, 1900, Captain U. S. Reserves 1917, member Advisory Board American Defense Society, Commander Legion of Honor, France, etc.

BELOIT, city in Rock co., Wis.; on the Rock river, and the Chicago and Northwestern, and the Chicago, Milwaukee and St. Paul railroads; 85 miles S. W. of Milwaukee. The city derives fine power for manufacturing from the river; and has one of the largest woodworking machinery plants in the world, besides manufactories of gas engines, windmills, iron, paper-mill machinery, ploughs, paper, rye flour, and bicycles. The city is widely known as the seat of Beloit College. Pop. (1910) 15,125; (1920) 21,284.

BELOIT COLLEGE, a coeducational (non-sectarian) institution in Beloit, Wis.; organized in 1847 by the Congregational and Presbyterian Churches; reported at the end of 1919: Professors and instructors, 37; students, 300; volumes in the library, 50,000; number of graduates, 1,592; president, M. A. Brannon, Ph. D.

BELSHAZZAR, the last of the Babylonian kings, who reigned conjointly with his father, Nabonadius. He perished 538 B. C., during the successful storming of Babylon by Cyrus. This event is recorded in the book of Daniel; but it is difficult to bring the particulars there given into harmony with the cuneiform inscriptions.

BELT, in astronomy, a varying number of dusky, belt-like bands or zones encircling the planet Jupiter parallel to his equator, as if the clouds of his atmosphere had been forced into a series of parallels through the rapidity of his rotation, and the dark body of the planet was seen through the comparatively clear spaces between.

In physical geography, two passages or straits connecting the Baltic with the German Ocean, viz.: (a) the Great Belt, between the islands of Seeland and Laland on the N. and Fühnen and Langeland, on the W. (b) The Little Belt, between the mainland of Denmark on the W., and the island of Fühnen on the E.

BELUCHISTAN. See BALUCHISTAN.

BELVIDERE, a city of Illinois, the county-seat of Boone co. It is on the Kiswaukee river, and on the Chicago and Northwestern railroad. It is the center of a fertile agricultural region and has manufactures of sewing machines, safety razors, bicycles, automobiles, boilers, etc. There is a public library, a park, an opera house, and other public buildings. Pop. (1910) 7,253; (1920) 7,804.

BEMIDJI, a city of Minnesota, the county-seat of Beltrami co. It is on the Great Northern, and Minneapolis, Red Lake, and Manitoba, and other railroads. On account of its beautiful situation on a lake, it is a popular summer resort. It has a State normal school, Federal building, public library, and other public buildings. Lumbering is the chief industry. Pop. (1910) 5,099; (1920) 7,086.

BEMIS HEIGHTS, a village in Saratoga co., N. Y., on the Hudson river, famous as the scene of the first battle of Stillwater, Sept. 19, 1777.

BENARES, a town in Hindustan, capital of the Benares division, United Provinces of Agra and Oudh, British India, on the left bank of the Ganges, from which it rises like an amphitheater, presenting a splendid panorama of temples, mosques, palaces, and other buildings, with their domes, minarets, etc. Fine ghauts lead down to the river. It is one of the most sacred places of pilgrimage in all India, being the headquarters of the Hindu religion. The principal temple is dedicated to Siva, whose sacred symbol it contains. It is also the seat of government and other colleges, and of the missions of various societies. Benares carries on a large trade in the produce of the district and in English goods, and manufactures silks, shawls, embroidered cloth, jewelry, etc. Pop. about 220,000. The division has an area of 10,385 square miles, and a population of about 5,500,000.

BENBOW, JOHN, an English admiral, born in 1650 at Shrewsbury. His skill and valor, displayed during an action with a Barbary pirate at the head of a superior force, gained him a captaincy in the Royal navy. Rear-Admiral in 1700, he had his leg carried away by a chain-shot during an engagement with the French Commodore, Du Casse, in 1702, and he died in Jamaica, in 1702.

BENCH, in law, the seat which judges or magistrates occupy officially in a court of justice; also the judges or magistrates sitting together to try cases. The Court of King's bench (named, when a female sovereign is on the throne, the Court of Queen's Bench) formerly was one of the three chief courts in England. The judicial business of the Great Council of the nation coming to be transacted in the King's palace, the court which attended to it was called that of the *Aula Regis*, viz., of the King's palace. It gradually separated into three—the Courts of King's Bench, of Common Pleas, and of the Exchequer. From its very outset it was a court of record. Its separate existence was abolished by the judicature act of 1873, and now it is the King's Bench Division of the High Court of Judicature.

In engineering, a bench is a horizontal ledge on the side of a cutting; an embankment or parapet, a berme, a banquette.

BENCH WARRANT, a warrant issued by the court before which an indictment has been found to arrest the accused, that he may appear and find bail for his appearance at the trial. It is used extensively in the United States to bring into court persons who have neglected to obey an order of court, such as delinquent jurymen.

BENCOOLEN, or **BENKULEN**, a seaport on the W. coast of Sumatra Island, Dutch East Indies; capital of a residency of the same name. It was founded in 1685 by the English and ceded to the Dutch in 1824. Area of residency, 9,433 square miles; pop. of residency about 225,000; of town about 12,000.

BENDIGO, a city of Victoria, Australia, the capital of Bendigo co. It is about 100 miles N. W. of Melbourne. In the neighborhood are important gold mines. The town is situated in a fertile agricultural region and grain and fruit are extensively grown. There are handsome public buildings including a town hall, a mechanics' institute, and several churches. It is the seat of a Roman Catholic bishop. Pop. (1918) 35,590.

BENEDETTI, VINCENT, COUNT DE, a French diplomatist of Italian extraction, born in Bastia, Corsica, April 29, 1817; was educated for public service, held consulates in Cairo, Palermo, Malta, and Tunis; and was Secretary of the Congress of Paris in 1856, and drew up the protocols of the treaty then agreed upon. In 1861 he was appointed Ambassador to Italy, and in 1864 to Prussia. In 1870 Benedetti was under orders to protest against the candidature of Prince Leopold of the house of Hohenzollern for the crown of Spain. He became so im-

portunate in trying to carry out these orders that he was forbidden to seek further interviews with King William. The Ambassador had reiterated the demands of his government to the King while the latter was taking a walk on the promenade at Ems, thus committing a breach of court etiquette, and abusing his privileges as an ambassador. The refusal of the King to again receive Benedetti gave great offense in France, and was made a pretext for declaring war within a few days. After the fall of the Empire, Benedetti withdrew from public life. In 1871 he published a pamphlet charging Bismarck with the whole responsibility, to which the latter made a vigorous reply. Benedetti was author of "Studies in Diplomacy," an English translation of which appeared in 1895. He died in Paris, March 28, 1900.

BENEDICT I., POPE, succeeded John III., 575; died in 578, and was himself succeeded by Pelagius II.

BENEDICT II. succeeded Leo II., 684; died in 685, and was succeeded by John V.

BENEDICT III. succeeded Leo IV., 855. During his pontificate, the Saracens were ravaging Apulia and Campania. He died in 858, and was succeeded by Nicholas I.

BENEDICT IV., succeeded John IX., about 900. He crowned Louis, son of Boson, Emperor and King of Italy. He died in 903, and was succeeded by Leo V.

BENEDICT V. succeeded Leo VIII. in 964, and was appointed by the Romans in opposition to Leo VIII. The Emperor Otho, supporter of Leo, appeared before Rome with an army, reduced the city to famine, and a new assembly of the clergy declared to be null the election of Benedict, who was exiled. He died in 965.

BENEDICT VI. succeeded John XIII. in 972. After the death of the Emperor Otho I., the Romans imprisoned Benedict, who was strangled in the castle of St. Angelo, in 974.

BENEDICT VII., of the family of Conti, elected in 975. During his pontificate, the Emperor Otho II. came repeatedly to Rome, where he died in 984. Benedict died about the same time, and was succeeded by John XIV.

BENEDICT VIII., of the same family, succeeded Sergius IV., in 1012. In 1016, the Saracens from Sardinia having landed on the coast of Tuscany, Benedict attacked and defeated them. He crowned the Emperor Henry II., and his wife, in the Church of St. Peter. He died in 1024, and was succeeded by his brother, John XIX.

BENEDICT IX., a relative of the two preceding Popes, succeeded John XIX. in 1034. He was then very young, some say only 10 years old. He was distinguished by his licentiousness and profligacy, and by the state of anarchy in which Rome was plunged during his pontificate. He was deposed in 1048, and died in a convent in 1054, being succeeded by Leo IX.

BENEDICT X. was elected by a faction after the death of Stephen IX., in 1058; but the Council of Siena nominated Nicholas II. Benedict did not submit till the following year, when Nicholas made his entrance into Rome. He died in 1059.

BENEDICT XI., a Dominican, succeeded Boniface VIII., in 1303. Contemporary historians speak highly of his character and virtues. He died in 1304, and was succeeded by Clement V.

BENEDICT XII., JACQUES FOURNIER, a native of France, succeeded John XXII., in 1334, the Popes residing then at Avignon. His strictness in enforcing discipline among the monastic orders excited many enemies against him, who endeavored to cast aspersions upon his character. He died in 1342, and was succeeded by Clement VI.

BENEDICT XIII., Cardinal Orsini, succeeded Innocent XIII., in 1724, but it was with difficulty that he could be made to accept the pontificate. Benedict lived with the greatest frugality, and has been called more a monk than a Pope. His great fault was his implicit confidence in Cardinal Coscia, to whom he left the entire management of his government, and who much abused it. He died in February, 1731. His works were published in 1728, in three volumes folio. He was succeeded by Clement XII.

BENEDICT XIV. was born at Bologna in 1675, of the noble family of Lambertini. In 1728 he received a cardinal's hat; and in 1731 was nominated Archbishop of Bologna. On the death of Clement XII. (1740), he succeeded to the Papal throne. He reformed abuses, introduced good regulations, cultivated letters, encouraged men of learning, and was a patron of the fine arts. His tolerance exposed him to the censure of the rigorists among the College of Cardinals. Without exhibiting anything like indifference to the doctrines of the Church of which he was the head, he showed

urbanity and friendliness toward all Christians. The Protestants of Germany revered Benedict. With regard to France, he carefully avoided everything that could in the least encourage the fanatical party in that country in reviving the persecution against the Protestants of Languedoc. Benedict was learned, not only in theology, but in history and literature, and had also a taste for the fine arts. His works were published at Rome, in 12 volumes quarto. He died in 1758, and was succeeded by Clement XIII.

BENEDICT XV., Giacomo della Chiesa, born near Genoa in 1854. He was consecrated to the Church from his youth and educated for holy orders at Rome, being ordained a priest in his twenty-fourth year. From his first active years he seemed marked for an executive



POPE BENEDICT XV.

career. In 1883 he was appointed Secretary to the Nunciature at Madrid as chief aid to Cardinal Rampolla. After returning to Rome four years later he held various positions in the Secretariate there. His advancement after he had reached his thirty-fifth year was rapid. In 1900 he became a prelate of the Church—the following year Consultor of the Holy Office. In 1907 he was advanced to be Archbishop of Bologna. He became a Cardinal in 1914, shortly before the election which advanced him to the Papal chair on Sept. 3, 1914. During the World War he remained neutral, and, at various times, sought to bring about peace. See WORLD WAR.

BENEDICT, ST., the founder of the Order of the Benedictine Monks, was born at Nursia, in the Dukedom of Spoleto, in Italy, in 480 A. D. He was sent to Rome when very young, and there received the first part of his education; when 14 years of age, he removed to Subiaco, a desert place about 40 miles distant, where he was concealed in a cavern. The monks of a neighboring monastery subsequently chose him for their abbot; their manners, however, not agreeing with those of Benedict, he returned to his solitude, whither many persons followed him, and in a short time he was enabled to build no fewer than 12 monasteries. About 528 he retired to Monte Cassino, where idolatry was still prevalent. Having converted the people of the adjacent country, he broke the statue of Apollo, overthrew the altar, and built two oratories on the mountain, one dedicated to St. Martin, the other to St. John. Here St. Benedict also founded a monastery, and instituted the Order of his name, which in time extended all over Europe. It was here, too, that he composed his "Regula Monachorum." Authors are not agreed upon the place where St. Benedict died; some say at Monte Cassino; others affirm it to have been at Rome about 543 or 547. Gregory the Great, in the second "Book of his Dialogues," has written a "Life of St. Benedict."

BENEDICTINE, a liqueur prepared by the Benedictine monks of the abbey of Fécamp, in Normandy, consisting of spirit (fine brandy) containing an infusion of the juices of plants. It has been made in the same way since 1510.

BENEDICTINE, a follower of ST. BENEDICT (*q. v.*). In 529 St. Benedict transformed the temple of Apollo at Monte Cassino into a monastery, and became its first abbot. He composed rules for its management, making every monk pledge himself to perfect chastity, absolute poverty, and implicit obedience in all respects to his superiors. These vows were irrevocable, whereas up to that time the monks had been allowed to alter the regulations of their founder at their pleasure. The rule here instituted was adopted at an early period by various other monastic communities; it was confirmed, about 52 years after the death of its founder, by Pope Gregory the Great, and was ultimately accepted by nearly all the monkish communities of the West.

As long as the Benedictines remained poor, they were a blessing to the countries in which they lived, and especially to Germany, spending, as they did, several hours a day in gardening, agriculture, and mechanical labor, and another portion of their time in reading, besides keeping school outside the walls of their convents. Science and literature are also

indebted to them for having copied many of the classical authors and preserved such knowledge as existed in their age. When at length their merits brought wealth, luxury and indolence sapped their virtues and diminished their influence for good. Afterward they became reformed, especially in France, in the 17th century. The Benedictine habit consisted of a loose black coat, or a gown, reaching to their feet, and having large, wide sleeves. Under it was a flannel habit, white in color. The head-dress was a hood, or cowl, pointed at the tip. They were sometimes called Black Monks. The Benedictines control 16 colleges in the United States. There were Benedictine nuns as well as monks. When they originated is uncertain.

BENEDICTION (from the Latin *benedicere*, literally, "to speak well of"; "to commend"), a solemn invocation of the Divine blessing upon men or things.

BENEDICTUS, the name given to the hymn of Zacharias (Luke i: 68), used as a canticle in the morning service of the Church of England to follow the lessons. This position it has occupied from very ancient times. It is also used in the Church of Rome.

BENESH, EDWARD, a Czecho-Slovak statesman, one of the delegates at the Paris Peace Conference. He was a student of sociology and a teacher at the Czech University of Prague. He escaped from Bohemia early in the war and joined Thomas Masaryk, later president of Czecho-Slovakia, in the foundation of the Czecho-Slovakian Council. He performed valuable services in the Czecho-Slovakian army and secured recognition of the state by the Allies.

BENEVENTO (ancient Beneventum), a city of southern Italy, seat of an archbishop, capital of a province of the same name, between and near the confluence of the Calore and Sabato, 32 miles N. E. of Naples. The modern town is almost entirely constructed out of the ruins of the ancient. Among its most perfect remains of antiquity is the Arch of Trajan, erected about A. D 114. Near Benevento, in 1266, was fought the great battle between Charles of Anjou and his rival, Manfred, in which the latter was killed, and his army totally defeated. During the reign of Napoleon I., Benevento was formed into a principality conferred on Talleyrand. In 1815, it again reverted to the Pope. In 1860 it was annexed to the kingdom of Italy. Pop. about 25,000.

BENGAL, a state of British India reconstituted in 1905 and 1912 from the former Bengal presidency and provinces. Area, 78,699 square miles; pop. about 50,000,000.

Topography.—As a whole Bengal consists of plains, there being few remarkable elevations, though it is surrounded with lofty mountains. It is intersected in all directions by rivers, mostly tributaries of its two great rivers, the Ganges and Brahmaputra, which annually, in June and July, inundate a large part of the region. The Sundarbans or Sundarbunds (from being covered with the sunder tree), that portion of the country through which the numerous branches of the Ganges seek the sea, about 150 miles from E. to W. and about 160 from N. to S., is traversed in all directions by water courses, and interspersed with numerous sheets of stagnant water. The country is subject to great extremes of heat. The most unhealthful period is the latter part of the rainy season. The mean temperature of the whole year varies between 80° F. in Orissa, and 74° F. in Assam, that of Calcutta being 79°. The heaviest rainfall occurs in eastern Bengal, the annual average amounting to over 100 inches.

Productions.—Besides rice and other grains, which form, along with fruits, the principal food of the population, there may be noted among the agricultural products indigo, opium, cane sugar, tobacco, betel, cotton, and the jute and sunn plants. Tea is now extensively grown in some places, notably in Darjeeling district and Chittagong. Cinchona is cultivated in Darjeeling and Sikkim. The forests cover 12,000 square miles, the principal forest trees being the sál on the Himalaya slopes, sál and teak in Orissa. Wild animals are most numerous in the Sundarbans and Orissa, snakes being remarkably abundant in the latter district. The principal minerals are coal, iron, and salt. Coal is worked at Raniganj, in Bardwán district, where the seams are about 8 feet in thickness, and iron in the district of Bírbhúm, in the same division. Salt is obtained from the maritime districts of Orissa. The imports in 1919 were 64,04,52,684 rupees, and the exports 105,71,68,192 rupees.

Manufactures.—The principal manufactures are cotton piece goods of various descriptions, jute fabrics, blanketing, and silks. Muslins of the most beautiful and delicate texture were formerly made at Dacca, but the manufacture is almost extinct. Sericulture is carried on more largely in Bengal than in any other part of India, and silk weaving is a leading industry in many of the districts. The commerce, both internal and external, is

very large. The chief exports are opium, jute, indigo, oil seeds, tea, hides and skins, and rice. The foreign trade is chiefly with Great Britain, China, the Straits Settlements, France, the United States, and Ceylon.

Language.—The Bengali language is spoken by a majority of the population. It is like the numerous vernacular dialects spoken in northern India, apparently descended from the ancient classical language of the country, the Sanskrit. Its alphabet comprises 14 vowels and diphthongs, and 33 consonants. The ground work of the Bengali language is altogether Sanskrit.

Education, etc.—The first rudiments of education are usually given in the primary schools that have been developed out of the native schools, and are now connected with government. There are also a number of secondary and superior schools established by government, including eight government colleges. The highest educational institution is the Calcutta University, the chief function of which is to examine and confer degrees. There were in 1918 48,303 educational institutions, with 1,892,951 scholars. The total expenditure for education in that year was £1,699,569. The population of Bengal beyond the capital, Calcutta, and its suburbs, is largely rural.

History.—The first of the East India Company's settlements in Bengal were made early in the 17th century. The rise of Calcutta dates from the end of the same century. The greater part of Bengal came into the hands of the East India Company in consequence of Clive's victory at Plassy in 1757, and was formally ceded to the company by the Nabob of Bengal in 1765. Chittagong had previously been ceded by the same prince, but its government under British administration was not organized till 1824. Orissa came into British hands in 1803. In 1858 the country passed to the crown, and since then the history of Bengal has been, on the whole, one of steady and peaceful progress.

BENGAL, BAY OF, that portion of the Indian Ocean which lies between Hindustan and Farther India, or Burma, Siam, and Malacca, and may be regarded as extending S. to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawadi. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts.

BENGUELA (ben-gā'la), a district of the Portuguese colony of Angola on the W. coast of South Africa; The country is mountainous in the interior, and thickly intersected by rivers and streams. Its vegetation is luxuriant, including every description of tropical produce, and animal life is equally abundant. Copper, silver, iron, salt, sulphur, petroleum, and other minerals are found. The natives are mostly rude and barbarous. Pop. over 2,000,000. The capital, also called Benguela, or San Felipe de Benguela, is situated on the coast, on a bay of the Atlantic, in a charming, but very unhealthful, valley. It was founded by the Portuguese in 1617, and was formerly an important center of the slave trade, but has now only a spasmodic trade in ivory, wax, gum, copal, etc. Pop. about 3,600.

BENHAM, ANDREW ELLICOTT KENNEDY, an American naval officer, born in New York, April 10, 1832; entered the navy in 1847; served in the East India and the Home Squadrons in 1847-1852; attended the United States Naval Academy in 1852-1853; was commissioned Lieutenant in 1855; Lieutenant-Commander in 1862; Commander, 1866; Captain, 1875; Commodore, 1885; and Rear-Admiral in 1890, and was retired in 1894. During the Civil War he served in the South Atlantic and West Gulf Blockading Squadrons. In April, 1893, he commanded one of the divisions in the great naval display at New York; in 1894, as commander of a squadron at Rio de Janeiro, Brazil, he forced the commander of the insurgents' squadron to raise the blockade of the city and to discontinue firing on American merchant vessels; and in 1898 was naval prize commissioner in Savannah, Ga. He died Aug. 11, 1905.

BENI, a river of Bolivia, South America; formed by the union of all the streams flowing down the eastern Cordillera. It unites with the Mamore on the Brazilian frontier to form the Madeira. Its course is N. to N. E.; length, about 850 miles.

BENI, one of the departments of Bolivia, South America. It is in the N. E. part; area, about 40,000 square miles; pop. 107,744; chief town, Trinidad.

BENIN, a former negro kingdom of west Africa, on the Bight of Benin, extending along the coast on both sides of the Benin river, W. of the lower Niger, and to some distance inland. The chief town is Benin (pop. about 10,000), situated on the river Benin, one of the mouths of the Niger. Cotton is indigenous, and woven into cloth by the women,

and sugar-cane, rice, yams, etc., are grown. The religion is fetichism, and human sacrifices were formerly numerous. There is a considerable trade in palm oil.

In February, 1897, the Benin country was included within the Niger Coast Protectorate, and a British Resident was installed in the chief town. It is now included in the Colony and Protectorate of Nigeria.

BENIN, BIGHT OF, part of the Gulf of Guinea, west Africa, which extends into the land between the mouth of the river Volta and that of the Nun.

BENI SUEF, a town of Egypt; on the left bank of the Nile, about 65 miles S. of Cairo. It has the residence of the governor, and manufactures of stuffs, linen and carpets. Pop. about 25,000. The province of Beni Suef, of which it is the capital, has a population of about 400,000.

BENJAMIN, the youngest son of Jacob and Rachel (Gen. xxxv: 16-18). Rachel died immediately after he was born, and with her last breath named him Ben-oni, the "son of my sorrow"; but Jacob called him Benjamin, "son of my right hand." The tribe of Benjamin, small at first, was almost exterminated in the days of the Judges, but afterward it greatly increased. On the revolt of the ten tribes, Benjamin adhered to the camp of Judah; and the two tribes ever afterward closely united. King Saul and Saul of Tarsus were both Benjamites.

BENJAMIN, JUDAH PHILIP, an American lawyer, born in St. Croix, West Indies, Aug. 11, 1811; was of English parentage and of Jewish faith. He was educated at Yale College; admitted to the bar in New Orleans, in 1832; and elected to the United States Senate in 1852 and 1858. At the beginning of the Civil War, he resigned from the Senate and declared his adhesion to the State of Louisiana. In 1861 he accepted the office of Attorney-General in the Cabinet of Jefferson Davis, and afterward became successively Confederate Secretary of War and Secretary of State. After the war he went to London, England, was admitted to the bar in 1866 and became famous. He wrote a "Treatise on the Law of Sale of Personal Property" (1868). He died in Paris, May 7, 1884.

BEN LAWERS, a mountain in Perthshire, Scotland, flanking the N. W. shore of Loch Tay. It is rich in Alpine plants, and there is a magnificent view from its summit, which is, with the cairn at the top, 4,004 feet high.

BEN LEDI, a mountain (2,875 feet) of Perthshire, Scotland, 4½ miles W. by N. of Callander. A jubilee cairn was erected on it in 1887.

BENLOMOND, a mountain of Scotland, in Stirlingshire, on the E. shore of Loch Lomond, rising to a height of 3,192 feet and giving a magnificent prospect of the vale of Stirlingshire, the Lothians, the Clyde, etc.

BENNETT, (ENOCH) ARNOLD, English novelist and playwright, who has won a high and distinctive place in modern fiction. He was born at Hanley, England, May 27, 1867. He was at first inclined to follow law as a profession, but abandoned this for journalism, becoming editor of "Woman" in 1896. But his creative instinct sought expression in fiction, to which he devoted himself after 1900. His first two novels made no deep impression, but a veritable sensation was produced by the first of his stories of the pottery district of North Staffordshire, "Anna of the Five Towns" (1902). This was followed at intervals until 1912 by six other books of the same type, all dealing with the "Five Towns" and in many cases involving the same characters. On a limited scale, it was like the "Comédie Humaine" of Balzac. With marvelous ability Bennett takes the dull, monotonous lives of various classes in an English factory district and shows the strength and fierceness at times of the elemental passions beneath the drab exteriors. As Trollope was the historian par excellence of the life that went on in ecclesiastical towns, so Bennett registers the currents of existence in the manufacturing centers, which to so many writers seem destitute of all romance. In his fecundity, too, he resembles Trollope, and over 30 novels have been written by him, all of them marked in varying degrees by literary distinction. He has also written several plays that have attained success, most notable of which is "Milestones" (1912). During the World War he has written many articles bearing on widely differing phases of the conflict.

BENNETT, JAMES GORDON, a Scotch-American journalist; founder and proprietor of the New York "Herald," born in Newmill, Keith, Sept. 1, 1795. Trained for the Roman Catholic priesthood, he emigrated to the United States in 1819, where he became in turn teacher, proof reader, journalist, and lecturer. He had acted as casual reporter and writer in connection with several journals, and had failed in one or two journalistic ventures, previous to the issue of

the first number of the New York "Herald," May 6, 1835, price one cent. He spared no effort and expense in securing news, and laid the foundation of its after success. It was the first newspaper to publish the stock lists and a daily money article. He died in New York, June 1, 1872.

BENNETT, JAMES GORDON, an American journalist, born in New York City, May 10, 1841; son of James Gordon Bennett, founder of the New York "Herald," of which he became managing editor in 1866, and from that time largely controlling, and becoming proprietor on the death of his father in 1872. In 1870 he sent Henry M. Stanley on the exploring expedition which resulted in the finding of Dr. Livingstone, and, in conjunction with the London "Daily Telegraph," supplied the means for his journey across Africa by way of the Kongo in 1874-1878. He organized a system of storm prognostications of value to shipping masters; fitted out the "Jeannette" Polar expedition; and, in 1883, was associated with John W. Mackay in organizing the new Commercial Cable Company. He founded the "Evening Telegram" in New York, and established daily editions of the "Herald" in Paris and London. He early gave much attention to yachting. He resided mainly in Paris until his death, May 14, 1918. By the terms of his will Mr. Bennett left the bulk of his fortune to found and endow a home for journalists.

BENNETT, RICHARD, an American actor and manager, born in Bennett's Mill, Ind., in 1872. He was educated in the public schools and at the Logansport Normal School. After several years spent on the stage as an actor, he produced and appeared in Brieux's play, "Damaged Goods." He also produced several other plays of Brieux and other French playwrights in the United States. He was from 1896 to 1908 associated with Charles Frohman in the production of plays. He was chairman of the executive board of the National Society of Sociology.

BEN NEVIS, the most lofty mountain in Great Britain, in Invernessshire, immediately E. of Fort William and the opening of the Caledonian canal, at the S. W. extermity of Glenmore. It rises to the height of 4,406 feet, and in clear weather yields a most extensive prospect. An observatory was established on its summit in May, 1881, by the Scottish Meteorological Society.

BENNINGTON, town and county-seat of Bennington co., Vt.; on the New York Central railroad; 36 miles E. of Troy, N. Y. It contains the villages of Bennington, North Bennington and Bennington Center; and has large woolen and knit goods factories; a Soldiers' Home, a Memorial Battle monument, dedicated on the centennial of the admission of the State into the Union, March 4, 1891, two National banks, and graded public schools. There are valuable deposits of brown hematite ore in the town. Bennington is historically famous on account of the battle fought Aug. 16, 1777, when General Stark with his "Green Mountain Boys" defeated a large British detachment sent from General Burgoyne's army to capture the public stores near North Bennington. Pop. (1910) 6,211; (1920) 9,982.

BEN NUT, the seed of *moringa pterygosperma*, the ben tree of India, yielding the valuable oil of ben.

BENSON, ARTHUR CHRISTOPHER, an English essayist and educator, born in 1862, the brother of E. F. and R. H. Benson, and the son of Edward White Benson, former Archbishop of Canterbury. He was educated at King's College, Cambridge, and from 1885 to 1903 was a master at Eton College and became well known as a writer of essays. The best known of these are "The Upton Letters" (1905); "From a College Window" (1906); and "The Silent Isle" (1919). He also wrote poetry of considerable merit and several novels. In addition to these he prepared a biography of his father, Archbishop Benson, in 1889, and a biography of Ruskin in 1911.

BENSON, EDWARD FREDERIC, an English author, born in Wellington College, July 24, 1867; educated at King's College, Cambridge; worked at Athens for the British Archæological School in 1892-1895, and in Egypt, for the Hellenic Society, in 1895; traveled in Algiers, Egypt, Greece, and Italy. His writings include "Dodo" (1893); "Rubicon" (1894); "Judgment Books" (1895); "Limitations" (1896); "The Babe" (1897); "Vintage" (1898); "The Capsina" (1899); "Angel of Pain" (1906); "Dodo the Second" (1914); "The Tortoise" (1917); etc.

BENSON, EDWARD WHITE, Archbishop of Canterbury, born near Birmingham in 1829; graduated at Cambridge in 1852, and was for some time a master at Rugby. He held the headmastership of Wellington College from its opening in 1858 to 1872, when he was made a Canon and Chancellor of Lincoln Cathedral. In 1875 he was appointed Chap-

lain in Ordinary to the Queen, and, in December, 1876, was nominated to the newly erected Bishopric of Truro. Here he began the building of a cathedral (1880-1887), most of the first cost, £110,000, having been gathered by his own energy. In 1882 he was translated to Canterbury to succeed Dr. Tait as Primate of all England. He published several volumes of sermons, a small work on "Cathedrals," and a valuable article on "St. Cyprian." He died at Hawarden, Oct. 11, 1896.

BENSON, FRANK WESTON, an American painter, born in Salem, Mass., March 24, 1862; was educated at the Museum of Fine Arts, Boston, and in Paris; became a member of the Society of American Artists in 1888, and of the National Acedemy. He won the Hallgarten and the Clarke prizes at the National Academy of Design in 1889 and 1891, and is best known for his portraits.

BENSON, ROBERT HUGH, an English prelate and writer, born in 1871, brother of A. C. and E. F. Benson. He was educated at Trinity College. He became associated with Dean Vaughan and other Roman Catholic clerics, and in 1903 was received in the Roman Catholic church. He was ordained priest in the following year. In 1911 he was appointed private chamberlain to Pope Pius X. He wrote much on religious subjects and published several novels. The best known of the latter are "The Coward"; "Come Rack! Come Rope!"; "An Average Man" (1913). He died in 1914.

BENSON, WILLIAM SHEPHERD, an American naval officer, born in Macon, Ga., Sept. 25, 1855. He graduated at the Annapolis Naval Academy in 1877. He rose through various grades of the service until he became captain in 1909. He was made rear-admiral, May 11, 1915. In 1916 he became admiral and in 1917 was made President of the Navy General Board. In this capacity he co-operated closely with Secretary Daniels before and during the World War. In 1920 he became prominent as one of the principals in a sensational episode. Vice-Admiral Sims, who had been in command of the American fleet in Atlantic waters abroad during the war, testified before a naval inquiry committee in Washington that prior to his departure to take command he had been warned by a high navy official: "Don't let the British pull the wool over your eyes. We would as leave fight them as the Germans." The disclosure made a painful impression, both in America and abroad. It was felt certain that the high official mentioned must be either Secretary Daniels or Admiral Benson, the only two who were qualified by rank to give orders to Sims. Secretary Daniels came out promptly in a sweeping denial that he had ever used such language or given such instructions. Sims later stated that Benson was the official that he referred to, and the latter himself, although denying all recollection of having used such words, admitted that he had cautioned Sims against letting himself be too much swayed by British influences.

BENTHAM, JEREMY, an English jurist, born in London, Feb. 15, 1748; educated at Westminster and Oxford; entered Lincoln's Inn, in 1763. He was called to the bar, but did not practice, and, having private means, devoted himself to the reform of civil and criminal legislation. A criticism on a passage in Blackstone's "Commentaries," published under the title, "A Fragment on Government" (1776), brought him into notice. His most important works are: "The Hard Labor Bill" (1778); "Principles of Morals and Legislation" (1780); "A Defense of Usury" (1787); "Introduction to the Principles of Morals and Legislation" (1789); "Discourses on Civil and Penal Legislation" (1802); "Treatise on Judicial Evidence" (1813); "Paper Relative to Codification and Public Instruction" (1817); and the "Book of Fallacies" (1824). His mind, though at once subtle and comprehensive, was characterized by something lacking in method and sense of proportion; and he is therefore seen at his best in works revised by his disciples. In England, James Mill, Romilly, John Stuart Mill, Burton, and others of independent genius, have been among his exponents. In ethics he must be regarded as the founder of modern utilitarianism; in polity and criminal law he anticipated or suggested many practical reforms; and his whole influence was stimulating and humanizing. He died in London, June 6, 1832, leaving his body for dissection.

BENTLEY, RICHARD, an English critic, born in Oulton, Yorkshire, Jan. 27, 1662. He is pronounced by some authorities the best classical scholar England has produced. His writings are "Latin Epistle to John Mill, Containing Critical Observations on the Chronicle of Joannes Malala" (1691); the very celebrated "Dissertation on the Epistles of Phalaris" (1697); and editions of Horace and Terence, besides commentaries on the classics, all of great value. He died in July, 1742.

BENTON, a city of Illinois, the county-seat of Franklin co. It is on the Illinois Central, the St. Louis, Iron Mountain and Southern, and the Chicago and Eastern Illinois railroads. There are important industries, including the manufacture of stoves. There are also extensive coal mines in the neighborhood. Pop. (1910) 2,675; (1920) 7,201.

BENTON, GUY POTTER, an American educator, born at Kenton, O., in 1865. He graduated from Baker University and took post-graduate courses at the University of Wooster and in Berlin. From 1890 to 1895 he was superintendent of schools at Fort Scott, Kan., and in 1895-1896 he was assistant state superintendent of public instruction, Kansas. He served as professor of history and sociology at Baker University from 1896 to 1899. From the latter year to 1902 he was president of the Upper Iowa University. In 1902 he was appointed president of Miami University, serving until 1911, when he became president of the University of Vermont. He was a member of the Kansas State Board of Education, president of the Southeastern Kansas Teachers' Association, and a member and officer of several other educational societies. From 1910 he was secretary of the National Association of State Universities. During the World War he was in the service of the Y. M. C. A. in the city of Paris. He wrote "The Real College" (1909).

BENTON, THOMAS HART, an American statesman, born near Hillsboro, N. C., March 14, 1782; settled in Tennessee, where he studied law, and was elected to the Legislature. In 1812 he raised a regiment of volunteers, and also served on General Jackson's staff. On the admission of Missouri as a State, he was chosen United States Senator in 1820, and served 30 years. A determined opponent of Calhoun's nullification scheme, he afterward supported Jackson in his war on the United States bank, and earned the sobriquet of "Old Bullion" by his opposition to the paper currency. He published "A Thirty Years' View, or a History of the Working of the American Government from 1820 to 1850" (2 vols., 1854-1856) and "An Abridgment of the Debates of Congress from 1789 to 1856" (15 vols., 1857). He died in Washington, April 10, 1858.

BENTON HARBOR, a city of Michigan, in Berrien co. It is on the St. Joseph river, and on the Pere Marquette, the Cleveland, Cincinnati, Chicago and St. Louis, and the Michigan Central railroads. It is connected with Lake Michigan by a ship canal, has an excellent harbor, and is connected by steamboat lines with Chicago and Milwaukee. There are important manufactures of furniture, flour, lumber, etc. In the neighborhood are medicinal springs which have made the city an important summer resort. Pop. (1910) 9,185; (1920) 12,233.

BENZENE, an aromatic hydrocarbon, also called benzol, or phenyl hydride, discovered in 1825 by Faraday in the liquid condensed during the compression of oil gas. In 1849, it was found in coal tar by C. B. Mansfield, who lost his life while experimenting with it on Feb. 25, 1855. Aniline is produced from it, which again is the source of the celebrated modern dyes. It is obtained from the more volatile portion of coal tar oil. It is also formed by distilling benzoic acid with lime. Benzene is a thin, colorless, strongly refracting liquid; it boils at 82°. It dissolves fats, resins, iodine, sulphur, and phosphorus; sp. gr., 0.885.

BENZOATE OF SODA, a preservative used in the manufacture of food products. The use of it in a quantity not greater than one-tenth of 1 per cent. is permitted by the Federal Government, but its use among packers of food has gradually been abolished.

BENZOIC ACID, a vegetable acid obtained from benzoin and other resins and balsams, as those of Peru and Tolu. It forms light feathery needles; taste pungent and bitterish; odor, slightly aromatic. The salts of benzoic acid are known as benzoates.

BENZOIC ETHER, a colorless, oily liquid, with a feeble aromatic smell and a pungent aromatic taste, obtained by distilling together four parts alcohol, two of crystallized benzoic acid, and one of concentrated hydrochloric acid.

BENZOIN, BENZOINE, BELZOIN, BENZOIL, or **BENJAMIN**, in botany and commerce, as benjamin, a kind of resin, obtained from a tree, the styrax benzoin, which belongs to the order *ebenaceæ* (ebenads). It grows in Sumatra, Borneo, and the adjacent islands. It is used as a medicine in chronic diseases of the lungs, as an ingredient in perfumery, and in the incense of Roman Catholic and Ritualist churches.

In botany, as benzoin, a genus of plants belonging to the order *lauraceæ* (laurels). The species are found in North America and in Nepaul. The berries of *benzoin odoriferum* yield an aromatic stimulant oil.

In chemistry ($C_{14}H_{12}O_2$) a polymeric modification of benzoic aldehyde, which

remains in the retort when the crude oil is distilled with lime or iron oxide to free it from hydrocyanic acid.

BEOWULF (bā'ō-wölf), an Anglo Saxon epic, the only manuscript of which belongs to the 8th or 9th century, and is in the Cottonian Library (British Museum). From internal evidence it is concluded that the poem in its essentials existed prior to the Anglo-Saxon colonization of Britain. It recounts the adventures of the hero Beowulf, especially his delivery of the Danish kingdom from the monster Grendel and his equally formidable mother, and, lastly, the slaughter by Beowulf of a fiery dragon, and his death from wounds received in the conflict.

BERANGER, PIERRE JEAN DE (bā-rôn-zhā'), a French poet, born in Paris, Aug. 19, 1780. His father took him to Paris in 1802; but they soon quarrelled and he began life in that garret which became famous. In 1804 Lucien Bonaparte helped him out with a clerkship in the University. Meanwhile he had composed many convivial and political songs, but never wrote them down until 1812. When his poems were published, in 1815, he was recognized as the champion of the faction opposed to the Bourbons. His popularity with the working classes was immense, and he made the song a powerful political weapon. His republicanism and enthusiasm for Napoleon suited the multitude. Two volumes published in 1821 led to his imprisonment; and another in 1825 caused a second incarceration. "New Songs," appeared in 1830, and his "Autobiography" in 1840. In 1848 he was elected to Parliament, but begged to be released. His songs are full of wit, light-heartedness, and musical grace. Among the best are the "King of Yvetot," "The Old Flag," "The Old Corporal," "Roger Bontemps," "My Grandmother," "Little Red Man," "Little Gray Man," and "The Marquis of Carabas." He died in Paris, July 16, 1857.

BERAR, otherwise known as the Hyderabad Assigned Districts, a province of India, in the Deccan, under the British Resident at Hyderabad; area, 17,718 square miles, consisting chiefly of an elevated valley at the head of a chain of ghauts. It is watered by several affluents of the Godavari, and by the Tapti, and has a fertile soil, producing some of the best cotton, millet, and wheat crops in India. The two principal towns of Berar are Amráoti and Khamgaon. Pop. about 3,250,000. Coal and iron ore are both found in the province. Berar was assigned by the Nizam to the British Government in 1853, as security for arrears due. In 1902 the province was leased to Great Britain in perpetuity and attached to the Central Provinces administration.

BERAT, a town of Albania; on the Ergent river, here bridged; 30 miles N. E. of Valona. It is the seat of a Greek archbishop, and has a cathedral and a number of mosques, and several Greek churches. Pop. 15,000.

BERBER, a town of Nubia, on the right bank of the Nile, below the confluence of the Atbara. It is a station on the route from Khartum to Cairo. Since the railway was opened in 1906, taking the place of the caravan route, the traffic to the Red Sea has been diverted. Pop. about 10,000.

BERBERA, a seaport of British Somaliland, eastern Africa, with a good harbor, on a bay of the Gulf of Aden. It was conquered by Egypt in 1875, but in July, 1884, the British Government took possession of it, and a small Indian force is now stationed here. It is the scene of a large annual fair, which brings over 30,000 people together from all quarters in the East. Coffee, grains, ghee, gold dust, ivory, gums, cattle, ostrich feathers, etc., are brought hither from the interior, and exchanged for cotton, rice, iron, Indian piece goods, etc.

BERBERS, a people spread over nearly the whole of northern Africa west of Egypt, from whom the name Barbary is derived. The chief branches into which the Berbers are divided are, first, the Amazirgh, or Amazigh, of northern Morocco, numbering from 2,000,000 to 2,500,000. They are for the most part quite independent of the Sultan of Morocco, and live partly under chieftains and hereditary princes and partly in small republican communities. Second, the Shulluh, Shillooh, or Shellakah, who number about 1,450,000, and inhabit southern Morocco. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number 1,000,000; and fourth, the Berbers of the Sahara, who inhabit the oases. Among the Sahara Berbers the most remarkable are the Beni-Mzâb and the Tuaregs. To these might be added the Guanches of the Canary Islands, now extinct, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion is brown, and sometimes almost black, with brown and glossy hair. They are sparely built but robust and graceful; the features approach the European type. Their lan-

guage has affinities to the Semitic group, but Arabic is spoken along the coast. They are believed to represent the ancient Mauritanians, Numidians, Gætulians, etc. The Berbers live in huts or houses, and practice various industries. Thus they smelt iron, copper, and lead; manufacture gun barrels, implements of husbandry, etc., knives, swords, gunpowder, and a species of black soap. Some of the tribes breed mules, asses, and stock in considerable numbers, others practice agriculture.

BERBICE, a river of British Guiana; flows generally N. E. into the Atlantic. It is navigable for small vessels for 165 miles from its mouth, but beyond that the rapids are numerous and dangerous.

BERCHTOLD, LEOPOLD ANTHONY JOHANN SIGMUND, COUNT VON, Austro-Hungarian statesman upon whose



COUNT LEOPOLD VON BERCHTOLD

shoulders lies the responsibility of having signed the note that brought on the World War. He was born April 18, 1863. At the outset of his public careeer he was secretary in the Foreign Office at Vienna, and rose by gradual stages in the diplomatic service until he was appointed Ambassador to Russia in 1906. Feb. 19, 1912, he became Foreign Minister of Austria-Hungary, succeeding Count Aehrenthal. Count Berchtold was a man of personal probity and agreeable personality. He lacked stamina to carry out his intended policies, and soon became the plastic agent of stronger men in one of the most intriguing courts of Europe. It is alleged that he instigated Bulgaria to attack Serbia after the first Balkan War had come to a close, the dual monarchy having viewed with intense disfavor the growth of Serbia's strength. This plan having failed of its desired result, Berchtold made overtures to Italy for an attack on Serbia, but these were declined. This check deferred the war against Serbia, which, however, was kept always in mind while awaiting a favorable pretext for its declaration. The opportunity came in June, 1914, when the assassination of Archduke Franz Ferdinand, the heir to the Austrian throne, and his wife at Sarajevo furnished a colorable reason for holding Serbia responsible. A note was promptly despatched to Serbia, signed if not drafted by Berchtold, couched in the most offensive language and making demands that were incompatible with the sovereignty of any self-respecting state. Serbia made a conciliatory reply, offering to accept all the terms except those that were manifestly impossible without abdication of her sovereign power. No answer, however, would have been acceptable, for war had already been decided upon and was declared almost immediately after the receipt of Serbia's answer. In the early months of the war, Berchtold remained at the head of the Foreign Office, but resigned January, 1915, and was succeeded by Baron Burian. He became Chamberlain of the Imperial Court in February, 1917. See WORLD WAR.

BERDITCHEF, a town of Ukrainia, 108 miles W. S. W. of Kiev by rail, famous for its five annual fairs. At these, cattle, corn, wine, honey, leather, etc., are disposed of. Pop. about 100,000.

BEREA COLLEGE, a coeducational (non-sectarian) institution, in Berea, Ky.; organized in 1858; reported at the end of 1919: Professors and instructors, 81; students, 1,794; volumes in library, 35,000; productive funds, $1,345,588; income, $58,492; graduates, 1,479; president, William G. Frost, Ph. D., LL. D.

BERENGARIUS, OF TOURS, a theologian of the 11th century. He was born at Tours in 998, and was afterward archdeacon of Angers. He was thoroughly versed in the philosophy of his age, and did not hesitate to apply reason to the interpretation of the Bible. He denied the dogma of transubstantiation, and no less than seven councils were held respecting him, at three of which he was condemned, and at four he was prevailed on to make retractions. He died in 1088.

BERENSON, BERNHARD, an American writer, born at Wilna, Russia, in 1865. He graduated from Harvard University in 1887, and has since then lived near Florence, Italy. He was one of the best known authorities in art criticism. Among his writings are: "Venetian Painters of the Renaissance" (1894); "The Study and Criticism of Italian Art" (1902, 1915); "The Drawings of the Florentine Painters" (1903); "The Fifteenth Century" (1916); "Essays on Sienese Paintings" (1918). He was a frequent contributor to art magazines in the United States and foreign countries.

BERESFORD, LORD CHARLES DE LA POER, an English naval officer, born in Ireland, Feb. 10, 1846; became a Cadet in 1857; Lieutenant, 1868; Captain, 1882; and Rear-Admiral, 1897. In 1882 he commanded the "Condor" in the bombardment of Alexandria, and was especially mentioned and honored for his gallantry. In 1884-1885 he served on Lord Wolseley's staff in the Nile Expedition; and subsequently commanded the naval brigade in the battles of Abu Klea, Abu Kru, and Metemmeh. He commanded the expedition which rescued Sir Charles Wilson's party and was commended for his gallantry in both Houses of Parliament. In 1893-1896, he was in command of the naval reserve at Chatham, and in December, 1899, was appointed the second in command of the British squadron mobilized in the Mediterranean Sea. Lord Beresford accompanied the Prince of Wales on his visit to India in 1875-1876, as naval aide-de-camp, and held the same relation to the Queen in 1896-1897. He served several terms in Parliament, where he acquired a reputation as an outspoken critic, especially of naval affairs. Besides the numerous honors for gallantry as an officer he received three medals for saving life at sea under trying circumstances. In 1898 he visited China at the request of the Associated Chambers of Commerce of Great Britain; and on his return, in 1899, he passed through the United States, and was received with distinguished honors. He was commander Mediterranean squadron (1905-1907), and of the Channel Fleet (1907-1909). His publications include "Life of Nelson and His Times"; "The Break Up of China" (1899); "Memoirs" (1914). He also was a frequent contributor to magazines. He died in 1920.

BERESINA, or **BEREZINA**, a river of European Russia; rises in the district of Dissna, government of Minsk, which it traverses from N. to S.; after receiving various affluents, and being joined by a canal with the Don, it falls into the Dnieper, near Ritchitza, after a course of 200 miles. This river has been rendered famous on account of its disastrous passage by the French army during the retreat of Napoleon I. from Russia in 1812.

BERGAMO, a town of north Italy, capital of the province of Bergamo (1,076 square miles, about 550,000 inhabitants), consists of two parts, the old town, situated on hills, and the new town, almost detached and on the plain. It has a cathedral, an interesting church of the 12th century, a school of art, picture gallery, etc. It trades largely in silk, silk goods, corn, etc., has the largest annual fair in north Italy, and extensive manufactures. Pop. about 60,000.

BERGAMOT, a fruit tree, a variety of species of the genus *citrus*.

BERGEN, a seaport on the W. coast of Norway, the second town of the kingdom, about 25 miles from the open sea, on a bay of the Byfiord, which forms a safe harbor. The town is well built, with cathedral, museum, etc. The trade is large, timber, tar, train oil, cod liver oil, hides, and particularly dried fish (stock fish) being exported in return for corn, wine, brandy, coffee, cotton, woolens and sugar. It is the second largest port of Norway, its imports and exports in 1917 totalling almost 400,000,000 kroner. In 1445 a factory was established here by the Hanseatic cities of Germany. Pop. about 90,000.

BERGER, VICTOR L., an American socialist and editor, born at Nieder-Rebbuch, Austria, in 1860. He was educated in the schools and universities of Austria, but early in life removed to the United States, where he was employed at various trades. He later became a teacher in public schools, at the same time studying and lecturing on socialism. In 1892 to 1902 he was the editor of the Milwaukee "Daily Vorwärts," a Socialist newspaper. After acting as editor on several other Socialist papers, he became editor-in-chief of the Milwaukee "Leader," a Socialist daily. In 1896 he was a delegate to the People's Party Convention at St. Louis and endeavored to organize the support of Eugene V. Debs at that convention. He was a leader in the organization of the Social Democrat and the Socialist Democrat party of America and was a member of the executive board from its beginning. In 1904 he was Socialist Democratic candidate for mayor of Milwaukee and was also candidate for Congress in the same year. He was elected alderman of Milwaukee in 1910. In 1911 he was elected to the 62d Congress, the

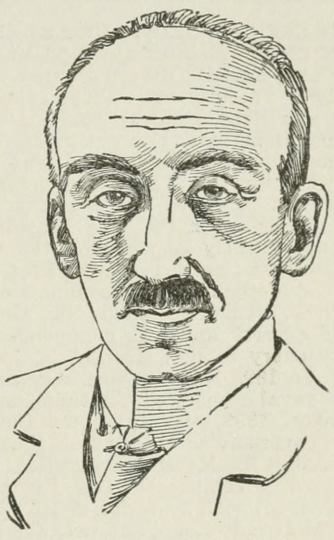
first Socialist to be elected a representative. He was re-elected to successive Congresses, including the 66th. He had in the meantime, however, been indicted, tried, and found guilty of sedition and disloyalty under the Espionage Act, in January, 1919. In February of the same year he was sentenced to twenty years in the Federal Prison. He appealed, however, and was released on bail. By a vote in the House of Representatives he was denied his seat. In spite of attempts to defeat him by a coalition of Democrats and Republicans, he was again elected representative in the special election, and was again denied a seat. Conviction reversed, January, 1921.

BERGERAC (berzh-rac'), a town in the French department of Dordogne, on the Dordogne, 60 miles E. of Bordeaux by rail. Most of its inhabitants are employed in the surrounding iron works and paper mills. The wines of the district, both white and red, are esteemed. During the wars with the English, Bergerac was a fortress and an entrepôt of trade; but after siding with the Calvinists, and, consequently, suffering greatly in the religious wars, the place was dismantled by Louis XIII. in 1621, while the revocation of the Edict of Nantes drove many of its citizens into exile. Pop. about 17,000.

BERGERAC, SAVINIEN CYRANO DE, a French author, born in Paris in 1619, distinguished for his courage, and for the number of his duels, more than a thousand, most of them fought on account of his monstrously large nose. He died in 1655. His writings, which are often crude, but full of invention, vigor, and wit, include a tragedy, "Agrippina," and a comedy, "The Pedant Tricked," from which Corneille and Molière have freely borrowed ideas; and his "Comical History of the States and Empires of the Sun and the Moon." He was made the hero of a drama bearing his name, written by Edmond Rostand.

BERGH, HENRY, an American humanitarian, born in 1820, in New York City. He was educated at Columbia University and for a time served in the diplomatic service as Secretary of Legation at St. Petersburg. He resigned from the service on account of ill health. He became interested in the treatment of domestic animals and succeeded in 1866, in the face of great opposition, in incorporating the American Society for the Prevention of Cruelty to Animals. He continued to agitate for the passage of laws to protect animals and by 1886 such laws had been adopted in 39 States of the Union and in other countries. He also founded the Society for the Prevention of Cruelty to Children. He wrote many plays and a volume of tales and sketches. He died in 1888.

BERGSON, HENRI LOUIS, a French philosopher, born in Paris in 1859. He was educated in the public schools of that city, graduating in 1881 from the Ecole Normal. Following some years of teaching he was appointed to the chair of philosophy in the Collège de France. In the following year he was elected to the Institute and was elected a member



HENRI LOUIS BERGSON

of the Academy of 1914. He delivered in 1913 a series of lectures in Columbia University and at the same time received the degree of Litt. D. from that institution. His writings became widely popular and many of them were translated into English. Among these were "Time and Free Will," "Matter and Memory," "Laughter," "Creative Evolution," "An Introduction to Metaphysics."

BERHAMPUR, the name of two Indian towns: (1) A town and military station in the N. E. portion of Madras presidency, the headquarters of Ganjám district, with a trade in sugar and manufactures of silks. Pop. about 30,000. (2) A municipal town and the administrative headquarters of Mur-Shidábád district, Bengal. It was the scene of the first overt act of mutiny in 1857. Pop. about 25,000.

BERIBERI, BERIBERIA, BERRI-BERRI, or **BARBIERS**, an acute disease characterized by oppression of

breathing, by general œdema, by paralytic weakness, and by numbness of the lower extremities. The percentage of mortality, which used to be very high, has been greatly reduced in recent years. Although the exact cause of the malady has not yet been discovered—in spite of exhaustive research—it is now generally agreed that its origin is dietetic. It is believed that fish and rice are primarily responsible for the disease. It occurs frequently in Ceylon among the colored troops, and on some portions of the Indian coast, but spasmodically in all parts of the world.

BERING, or **BEHRING, VITUS**, a Danish explorer, born in Jutland, in 1680. After making several voyages to the East and West Indies, he entered the service of Russia; became a captain-commander in 1722; and was sent by the Empress Catharine in charge of an expedition, whose object was to determine whether Asia and America were united. Crossing Siberia he sailed from the river of Kamchatka in July, 1728; and reached lat. 67° 18′ N., having passed through the strait since called after him, without knowing it. Discovering that land trended greatly to the W. he concluded that the continents were not united, and returned; without, however, seeing America. In another voyage, in 1741, he touched upon the American coast, in lat. 58° 21′ N.; and gave name to Mount St. Elias. In returning, his ship was cast upon an island, since named after him, an outlier of the Aleutian group, and here himself and many of his crew perished, in December, 1741.

BERING ISLAND, the larger of the two Kommander Islands; 115 miles from the E. coast of Kamchatka, crossed by 55° 10′ N.; contains the tomb of Bering, who died here after being shipwrecked in December, 1741. It is an important resort of seal hunters.

BERING SEA, that part of the North Pacific Ocean between the Aleutian Islands, in 55°, and Bering Strait, in 66° N., by which latter it communicates with the Arctic Ocean. It has on its W. side Kamchatka and the Chukchi country, with the Gulf of Anadyr, and on its E. the territory of Alaska, with Norton Sound and Bristol Bay; contains several islands and receives the Yukon river from North America and the Anadyr river from Asia. Fogs are almost perpetual in this sea. Ice is formed and melted in the sea every year, the northern part becoming closed to navigation about the beginning of November. The United States having claimed the exclusive right of seal fishing in the Bering Sea in virtue of the purchase of Alaska from Russia, and this right having been disputed by the British, it was decided in August, 1893, by an arbitration tribunal, to which the question was referred, that no such right existed, but at the same time regulations for the protection of the fur seal were drawn up and agreed to between the two powers, the chief being the prohibition of seal fishery within the zone of 60 miles round the Pribilof Islands, inclusive of the territorial waters, and the establishment of a close season for the fur seal from May 1 to July 31 inclusive, applying to the part of the Pacific and Bering Sea N. of 55° N. and E. of the 180th meridian from Greenwich.

In 1894 laws were enacted by both the United States and Great Britain to carry into effect the award of the Bering Sea arbitration of 1893, fixing penalties for illegal sealing, and authorizing, with certain limitations, the search and seizure of sealers of one of the nations by the naval and revenue forces of the other nation.

On Jan. 14, 1898, President McKinley submitted to Congress the awards and report of the commission appointed under the terms of a treaty to adjust the claims for compensation due sealers whose vessels had been seized by U. S. cutters prior to the establishment of a closed season in 1890. The bill for the payment was introduced in Congress on April 19, and was passed by the House on June 13, and by the Senate on June 14. It was promptly approved by the President, and the money was paid to Sir Julian Pauncefote, British Ambassador to the United States, on June 16.

BERING STRAIT, the channel which separates Asia and America at their nearest approach to each other, and connects the Arctic with the Pacific Ocean (Bering Sea). Between East Cape (Asia), and Cape Prince of Wales (America), it is 36 miles wide, and generally of slight depth. The shores rocky, bare, and greatly indented. It was discovered by Bering in 1728, and first explored by Cook in 1788.

BERKELEY, a town in Alameda co., Cal.; on the Southern Pacific, and the Atchison, Topeka and Santa Fé railroads; 8 miles N. E. of San Francisco. It is the seat of the State University of California; the State Agricultural College; the State Institution for the Deaf, Dumb, and Blind; and several college preparatory schools. The town is well equipped with electric light and street railroads; and has soap works, iron foundries and machine shops, and other

industries. Pop. (1910) 40,434; (1920) 56,036.

BERKELEY SOUND, next to Stanley Sound the most frequented inlet of the East Falkland Island, near its N. E. extremity. Though it is difficult to enter, it contains several excellent harbors.

BERKELEY, GEORGE, Bishop of Cloyne, Ireland, born in Ireland in 1685; became fellow of Trinity College, Dublin, in 1707; went to England in 1713; traveled on the Continent in 1714, and again in 1716-1720. In 1721 he was appointed Chaplain to the Lord-Lieutenant of Ireland, the Duke of Grafton. In 1724 he became Dean of Derry. He now published his "Proposals for the Conversion of the American Savages to Christianity by the Establishment of a College in the Bermuda Islands"; and subscriptions having been raised he set sail for Rhode Island in 1728. The scheme never got a start, however, and he returned, receiving the bishopric of Cloyne. He died suddenly at Oxford in 1753. Berkeley holds an important place in the history of philosophy. His most celebrated philosophical works are "Essay Toward a New Theory of Vision" (1709); "A Treatise on the Principles of Human Knowledge" (1710), in which his philosophical theory is fully set forth; "Three Dialogues Between Hylas and Philonous" (1713); "Alciphron, or the Minute Philosopher" (1732); and "Siris, Philosophical Reflections and Inquiries Concerning the Virtues of Tar-Water" (1744).

BERKSHIRE, county in England in the midland group. It has an area of 722 square miles, of which about three-fourths is under cultivation. The chief occupation of the people is stock raising and agriculture. The chief towns are Windsor, Reading, Maidenhead, and Newbury. Pop. about 180,000.

BERKSHIRES, THE, or **BERKSHIRE HILLS**, a range of mountains in the N. W. of Massachusetts; in Berkshire county; stretching 16 miles N. and S., on the E. of the valley of the Upper Hoosic river. They are a favorite summer and autumn resort.

BERLICHINGEN, GŒTZ VON, surnamed the "Iron Hand," a brave and turbulent German noble, born at Jaxthausen, Württemberg, in 1480. He was almost constantly at war, was put under the ban of the empire by Maximilian, and was killed during the siege of a fortress in which he had taken refuge, in 1562. His story was dramatized by Göthe.

BERLIN, the third largest city of Europe; capital of the former Kingdom of Prussia, and of the former Empire of Germany, now capital of the German republic, on both sides of the Spree river; 156 miles E. S. E. of Hamburg. Pop. about 2,000,000. It is built on a flat, sandy plain. Berlin occupies an area of over 25,000 acres, and now includes a number of former suburban towns and villages. The houses in the main are built of brick and plastered or stuccoed on the outside. The center of the city is now almost exclusively devoted to commerce, and the remarkable advance in the trade and political interests of the city since 1871 have attracted to it an enormous population. The principal streets are the famous Unter den Linden, with its four rows of lime trees and the stately Brandenburg Gate, the Wilhelmstrasse, the Königsstrasse, and the Leipzigerstrasse. Scattered about the city are a number of notable statues, including the remarkably imposing one of Frederick the Great, at the head of the Unter den Linden, and those of Schwerin, Winterfeld, Seidlitz, Keith, Zieten, Von Bülow, Leopold of Dessau, and the Great Elector. The Brandenburg Gate, which was begun in 1789, presents on each face six lofty Doric columns, and a Roman entablature, surmounted by an attic upon which is a bronze quadriga of "Victory." In the Belle Alliance Platz is a "Column of Peace," erected in 1840, to commemorate the peace of 1815. The triumphs of the German arms are further typified in the great "Monument of Victory," dedicated in 1875.

Notable Buildings.—In the center of the city is the old Royal Palace, containing nearly 700 apartments, including the richly adorned state rooms, the finest of which are the Weisser Saal, and the palace chapel. Near by are the palaces of the former Emperor and Crown Prince, the Royal Library, the old and new museums, the National Art Gallery, the arsenal, the Royal Theater, the opera house, the guard house, and the University of Berlin. These are all situated between the Spree and the E. end of Unter den Linden. Near the Königsplatz in the Thiergarten is the Reichstag, opened during the reign of Wilhelm II. On the Wilhelmstrasse is the former palace of the Imperial Chancellor, where the Congress of Berlin sat in 1878. The Old Museum contains antiquarian specimens, a remarkable collection of coins, a gallery of ancient sculpture, and a celebrated picture gallery; and the new museum has an invaluable collection of Egyptian antiquities brought together

by Lepsius; six magnificent mural paintings by Kaulbach on the grand staircase; a collection of over 500,000 engravings; and twelve rooms filled with valuable casts. The Brandenburg Gate is a copy of the Prophylæa at Athens, is 65 feet high and 205 feet wide, and marks the line of the old wall of the city.

Prior to the World War the city had a large traffic by the Spree, the canals, and the railways, the traffic by water being 50 per cent. greater than that of any other city or town in Germany. The Reichsbank is the chief bank in Germany for the issue of notes. The principal branches of industry were wool weaving, calico printing, the manufacture of engines and other machinery, iron, steel, and bronze ware, drapery goods, clothing, scientific instruments, chronometers, pianos, German silver ware, toys, chemicals, furniture, carpets, porcelain, linen goods, artificial flowers, and beer.

History.—As far back as the 13th century, the central part of the present city was inhabited. Kölln, on the island formed by the Spree on its left bank, was united to Old Berlin on the right bank in 1307. These names are still retained by the corresponding quarters of the modern city. Berlin was long little more than a fishing village; but when the Great Elector, Frederick William (1640-1688), had united the separate duchies of which Prussia is now formed, it became the capital. In the next century it received accessions of French and Bohemian colonists, driven into exile by religious persecution. Every inducement was then held out to bring foreigners to settle in the rising city. Under Frederick the Great it continued to prosper, and at his death had 145,000 inhabitants. The city was taken by the allies in 1760, and by Napoleon in 1806. After the peace of 1815 it became a focus of the arts and sciences, and a great center of commercial enterprise. The last quarter of the 19th century was a period of tremendous growth in wealth and population. The city suffered severely during the disturbances which followed the ending of the World War and the establishment of the German republic. See GERMANY.

BERLIN, a city of New Hampshire in Coos co. It is on the Grand Trunk and the Boston and Maine railroads. The city has excellent water power which is employed in the manufacture of paper, pulp, and lumber. There is a public library, theaters, hospital, excellent schools and a fine municipal building. Pop. (1910) 11,780; (1920) 16,104.

BERLIN, TREATY OF, a treaty signed July 13, 1878, at the close of the Berlin Congress, which was constituted by the representatives of the six Great Powers and Turkey. The treaty of San Stefano, previously concluded between Turkey and Russia, was modified by the Berlin Treaty, which resulted in the division of Bulgaria into two parts, Bulgaria proper and Eastern Rumelia, the cession of parts of Armenia to Russia and Persia, the independence of Rumania, Serbia, and Montenegro, the transference of Bosnia and Herzegovina to Austrian administration, and the retrocession of Bessarabia to Russia. Greece was also to have an accession of territory. The British representatives were Lords Beaconsfield, Salisbury, and Odo Russell. By a separate arrangement previously made between Great Britain and Turkey, the former got Cyprus to administer.

BERLIN, UNIVERSITY OF, a celebrated institution of learning in Berlin, Germany. It is, with the exception of Bonn, the youngest of the German universities. It was founded in 1810, when the Napoleonic victories had left Prussia apparently crushed and had even transferred her great University of Halle to the newly formed kingdom of Westphalia. The first rector of the university was Schmalz; the first deans of its faculties were Schleiermacher, Biener, Hufeland, and Fichte; and before it was 10 years old it had for professors such men as Niebuhr, Wolff, and Hegel. In more recent years, Ranke, Mommsen, Helmholtz, Virchow, and other famous scholars have added fame to the University. There are four faculties, theology, medicine, jurisprudence, and philosophy, with a total of 502 professors and teachers in 1914-1915. At the satisfactory completion of the course, the doctor's degree is conferred. The number of students in 1914-1915 was 8,035, besides a large number of non-matriculated ones.

BERLINER, EMILE, an American inventor and telephone expert; born in Hanover, Germany, May 20, 1851. He studied at Wolfenbüttel and came to America in 1870. In 1878 he was made chief inspector of instruments for the Bell Telephone Co. He showed remarkable ingenuity and invented the microphone and the gramophone, and secured many patents on improvements to the telephone. In 1908 he turned his attention to aeroplanes and invented the lightweight revolving cylinder internal combustion motor which was extensively used. He wrote a number of articles on religious and philosophical questions.

BERLIOZ, HECTOR (ber-lē-ōs'), a French composer, born in La Côte-Saint-André, Dec. 11, 1803. He forsook medicine to study music at the Paris Conservatoire, where he gained the first prize in 1830 with his cantata, "Sardanapale." After studying in Italy, he began to produce his larger works, and was forced to defend his principles in the press. His chief literary works are: "Traité d'Instrumentation" (1844); "Voyage Musical" (1845); "A Travers Chant" (1862). The more important of his musical works are "Harold en Italie," "Episode de la Vie d'un Artiste," and "Le Retour à la Vie;" "Romeo and Juliette" (1834); "Damnation de Faust" (1846); the operas "Benvenuto Cellini," "Beatrice and Benedict," and "Les Troyens," "L'Enfance du Christ," and the "Requiem." He died in Paris, March 9, 1869. After his death his "Memoirs" appeared.

BERMUDA CEDAR, a species of cedar which covers the Bermuda Islands. The timber is made into ships, boats and pencils. The wood of *juniperus barbadensis*, the Barbadoes cedar, is sometimes imported with it under the same name.

BERMUDA GRASS, a species of grass, called in Bermuda, devil grass. It grows in the American Southern States and in southern Europe. It is much esteemed for pasture.

BERMUDA HUNDRED, a locality in Chesterfield co., Va.; the scene of a battle in the Civil War between the Federal troops under General Butler, and the Confederates under General Beauregard. The battle was fought May 16, 1864, and resulted in a defeat for Butler.

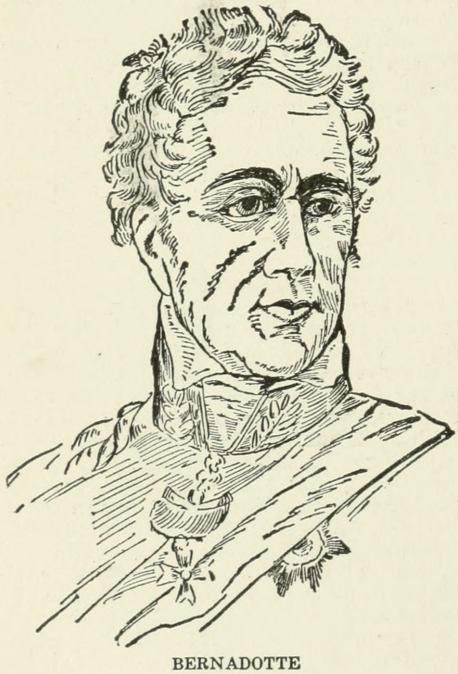
BERMUDAS, THE, or SOMERS' ISLANDS, a group of small islands, about 300 in number, in the North Atlantic Ocean, belonging to Great Britain, 580 miles from Cape Hatteras; area, about 30 square miles. The principal islands are Bermuda, St. George, Ireland, and Somerset. The protection afforded to shipping by their numerous bays, and their position in the track of the homeward bound West India vessels have led to the conversion of the Bermudas into a maritime rendezvous, and likewise, into a British naval station for West Indian fleets. The harbor of St. George's Island has been greatly improved, is fortified, protected by a breakwater, and has water and space enough to float the largest fleet. The principal productions are fruits, vegetables, maize, and tobacco. Pineapples are very abundant and largely exported. The climate is mild and salubrious; almost realizing the idea of a perpetual spring. Fish abound, and form a profitable source of industry to the inhabitants. Breadstuffs, etc., are imported from the United States, and manufactured goods from England. The imports in 1918 amounted to £692,742, and the exports to £119,977. The tonnage entering and clearing the ports in 1918 amounted to 732,613. During the World War Bermuda was an important station for the British Navy. Hamilton, on Bermuda Island, is the seat of the colonial government. Pop. of capital (1918) 2,700; of the islands 21,629. These islands were discovered by Bermudez, a Spaniard, in 1522, and settled by the English in 1607.

BERMUDEZ (ber-mū'dāth), a state in the N. E. of Venezuela, between the Orinoco and the Caribbean Sea, formed in 1881 from the former states and present sections of Barcelona, Cumana, and Maturin. Area, 32,243 square miles; pop. about 360,000.

BERN, or BERNE, a Swiss canton, bounded on the N. by France. It is the most populous, and next to the Grisons, the most extensive canton of Switzerland; its area being nearly 2,657 square miles, and its pop. about 683,000. The fertile valleys of the Aar and the Emmen divide the mountainous Alpine region in the S. from the Jura Mountains in the N. The Bernese Oberland, or Highlands, comprises the peaks of the Jungfrau, Mönch, Eiger, Schreckhorn, Finsteraarhorn, etc., and the valleys of Hasli, Lauterbrunnen, etc. The Lakes of Thun, Brienz, Neuchâtel, and Bienne are in the canton, which is watered by the Aar and its several tributaries. The climate is generally healthful. The plains of the Aar and the Emmen are the most fruitful, producing corn and fruits of various kinds, and affording excellent pasturage for cattle, which, with dairy produce, form the chief agricultural wealth of Bern. The vine grows in some districts. The horses of the Emmenthal are much prized. The lakes abound with salmon and trout. Iron mines are worked, and a little gold is found, and quarries of sandstone, granite, and marble are abundant. Its manufactures, which are not extensive, consist chiefly of linen, coarse woolens, leather, iron, and copper wares, articles of wood, and watches. Bern entered the Swiss Confederation, in which it now holds the second rank, in 1352. In the early part of the 19th century it received additions to its territory. The present constitution of the canton, proclaimed in 1874, but based on the laws of 1848, is one of representative democracy.

BERN, the chief city of the above canton, was by the decision of the Council of the Confederation, in 1848, declared to be the political capital of the Commonwealth. It is a fine, clean, well built town, on the Aar, 23 miles S. of Basel, and possesses many fine public edifices, more notably, the Cathedral, erected 1421-1502. The most remarkable feature in the town are the arcades, running in front of the houses down both sides of the two chief streets. The town has bears for its arms; and some of these animals are maintained in a large paved pit. The principal manufactures are watches, wooden clocks, and toys, linen, woolen, and silk fabrics. Pop. about 105,000. Bern was founded by Duke Berthold V. of Zähringen, in 1191, and was made a free and imperial city by a charter from the Emperor Frederick II., dated May, 1218.

BERNADOTTE, JEAN BAPTISTE JULES (ber-na-dot'), a French general, afterward raised to the Swedish throne,



BERNADOTTE

was the son of an advocate of Pau, born Jan. 26, 1764. He enlisted at 17, became sergeant-major in 1789, and subaltern in 1790. In 1794 he was appointed a General of Division, and distinguished himself greatly in the campaign in Germany, and on the Rhine. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. The following year he became for a short time Minister of War, and on the establishment of the Empire was raised to the dignity of Marshal of France, and the title of Prince of Ponte-Corvo. On the death of the Prince of Holstein-Augustenburg, the heir apparency to the Swedish crown was offered to the Prince of Ponte-Corvo, who accepted with the consent of the Emperor, went to Sweden, abjured Catholicism, and took the title of Prince Charles John. In the maintenance of the interests of Sweden, a serious rupture occurred between him and Bonaparte, followed by his accession, in 1812, to the coalition of sovereigns against Napoleon. At the close of the war the Emperor of Austria and other sovereigns tried to restore the family of Gustavus IV. to the crown; but Bernadotte, retaining his position as Crown Prince, became King of Sweden on the death of Charles XIII., in 1818, under the title of Charles XIV. He died March 8, 1844, and was succeeded by his son Oscar.

BERNARD, SAINT (GREAT and LITTLE). See ST. BERNARD.

BERNARD, ST., Abbot of Clairvaux, was born of a noble family in Burgundy, in 1091. At the age of 23 he entered the recently founded monastery of Citeaux, accompanied by his brothers and 20 of his companions. His ability and piety led to his being chosen Abbot, an office he filled till his death. In 1128 he prepared the statutes for the Order of Knights Templar. Popes and princes desired his support, and submitted their differences to his arbitration. By his influence Innocent II. was recognized as lawful Pope; he had a public debate with Abelard on some doctrines of his philosophy, and procured his condemnation; courageously opposed the doctrine of the Immaculate Conception of the Virgin; was founder of 160 monasteries; and was the chief promoter of the second crusade. He preached the crusade in Germany, persuaded the Emperor Conrad to join it, and refused the command which was offered him. His prediction of success was falsified. St. Bernard was the vehement adversary of Arnold of Brescia, and procured his banishment from Rome and from Zürich. He steadily refused the offers of several archbishoprics and other dignities, preferring to remain abbot only. His character and his writings have earned him the title of "Last of the Fathers." The power, tenderness, and simplicity of his sermons and other works have secured the admiration of Protestants and Catholics alike. St. Bernard died at Clairvaux in 1153, and was canonized in 1174.

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